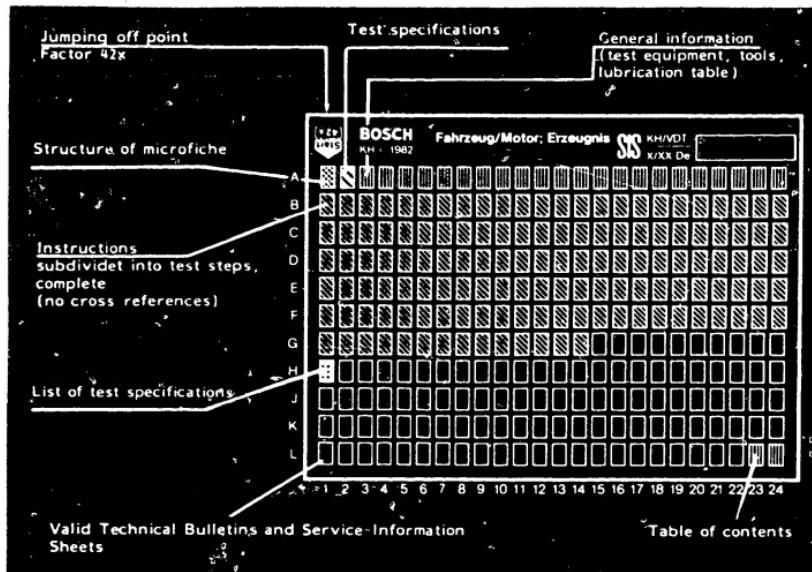
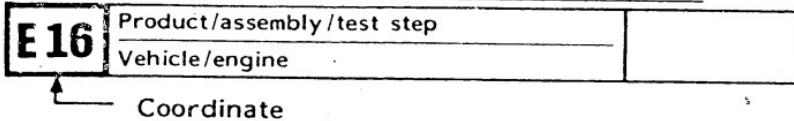


Structure of microfiche

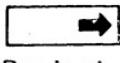


1. Read from left to right

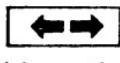
2. Title of microfiche (appears on each coordinate)



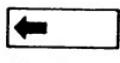
3. Limits of section



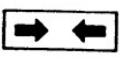
Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6

C6

A1

Repair and testing



1. Test specifications

For test specifications see microfiche

List of test specifications W-237/1000

and -

Test specifications for ignition
distributors W-237/1001

We must in this case refer to Coordinate H1 since, owing to the vast number of test specifications, it is not possible to present them here as is usually the case in the SIS system.

In the list of test specifications the Part No. of your ignition distributor is followed by the microfiche number and the Coordinates on which you can find the appropriate test specifications.

The new test specifications must only be used together with the new distributor test bench ZVS 50 (0 683 400 200) and distributor test adapter KDZV 7202.

Reason: The advance curves have been matched to this equipment.

A2

Test specifications

Ignition distributors 0 237 ... , ZV-I



2. Test equipment and tools required for repair

1 Clamping fixture	KDZV 7221
1 Puller	KDZV 7724
(only for short-type ignition distributors)	
1 Round-nose pliers	Commercially available
1 Circlip pliers	Commercially available
2 Screwdrivers	Commercially available
1 Drift < 2 mm diameter	Commercially available

2.1 Test equipment and tools required for testing

Distributor test bench ZVS 50	0 683 400 200
Distributor test adapter	KDZV 7202
Distributor test adapter accessories	KDZV 7203 7204 7209 7210 7211
Tachometer e.g. KTE 001.03	0 686 400 103
Measuring oscilloscope (with probe 1 : 1) e.g. Hameg	Commercially available
Voltage stabilizer e.g. Gossen 12 V/10 A	Commercially available
Battery 12 V 84 Ah charged e.g.	0 183 058 411
Ohmmeter e.g. ETE 014.00	0 684 101 400
Contact feeler gauge or feeler gauge (0.05...1 mm)	KDZV 7399 Commercially available
Adjustment throttle (without pressure gauge)	1 688 130 132
Pressure gauge 0...1.6 bar, Quality class 1.0, 0.05 graduations (e.g. Wika Type 211.160.1.6 - Part No. 4184)	
Note: Pressure gauge and adjustment throttle are frequently already available in the diesel workshop and are used there for testing the manifold pressure compensators on diesel injection pumps.	



3. Lubricants

Plain-bearing grease	Part No.
VS 14060 Ft 250g can	5 964 520 125
Silicone paste	
Ft 2 V 4 50g tube	5 700 083 005
Special oil	
OI 1 V 13 0.51 can	5 962 260 605

3.1 Lubrication table

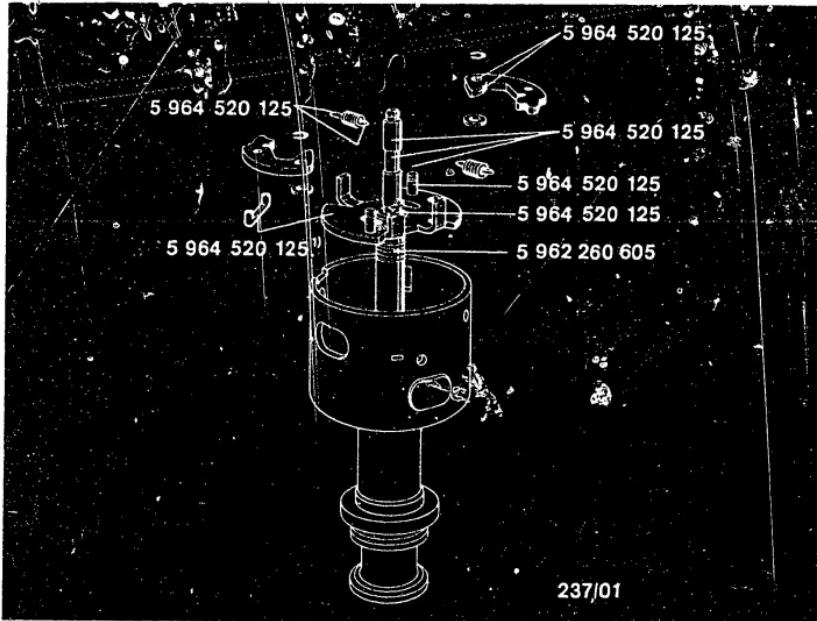
General

The following exploded views show the points which must be treated with the stated lubricants or with thermal-conduction paste.

Pay particular attention to footnotes.

The exploded views cannot be used for the assembly of ignition distributors (incomplete).





237/01

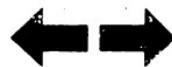
Lubrication points and lubricants on centrifugal advance mechanism

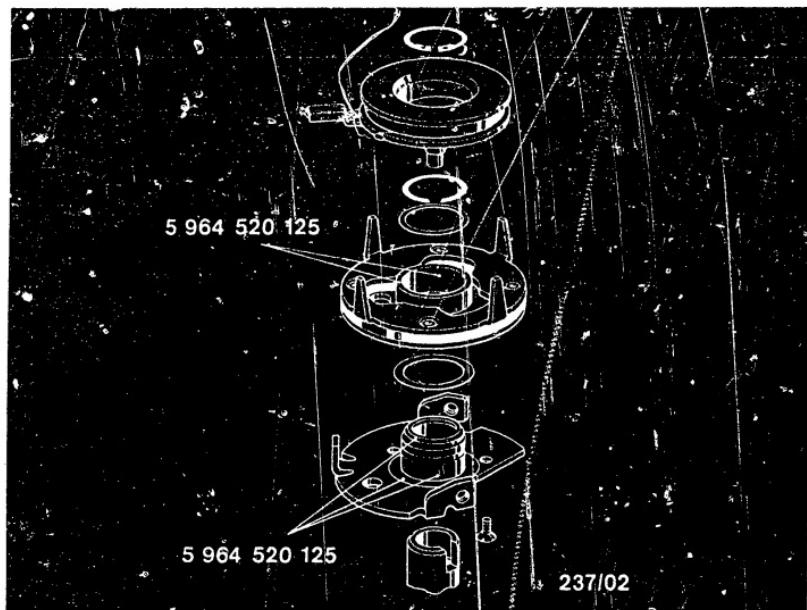
- 1) Grease the plastic rubbing block and the bearing surface on the shaft plate.

A5

Lubrication table

Ignition distributors 0 237..., ZV-I





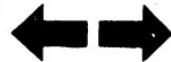
237/02

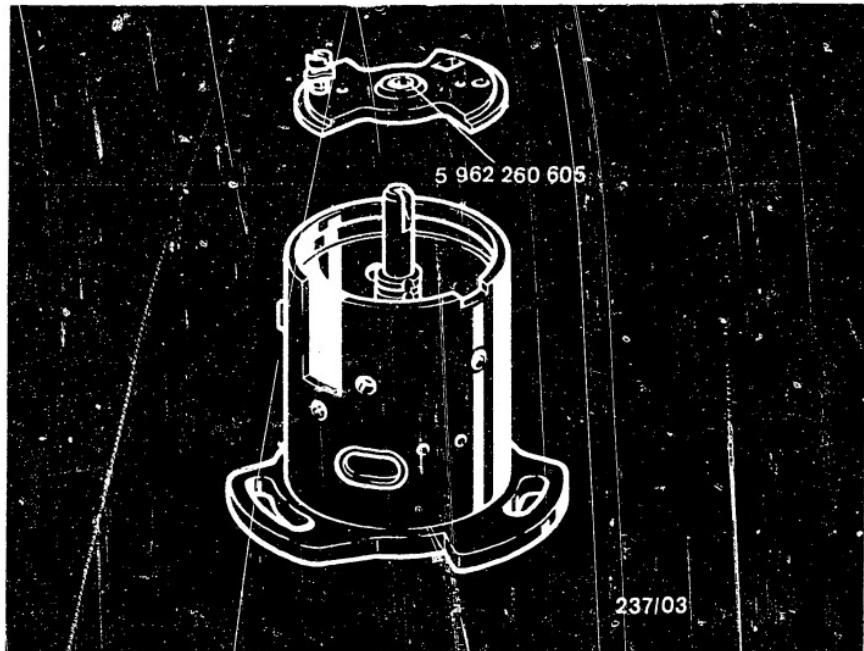
Lubrication points and lubricants on ignition pulse generator

A6

Lubrication table

Ignition distributors 0 237..., ZV-I



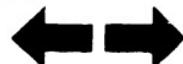


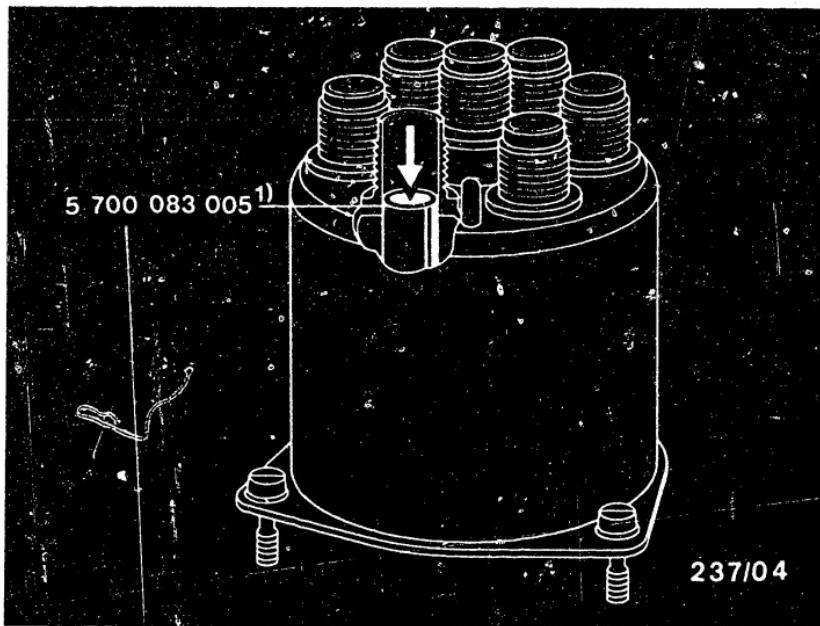
Lubrication point and lubricant on short-type ignition distributor with bearing end plate.

A7

Lubrication table

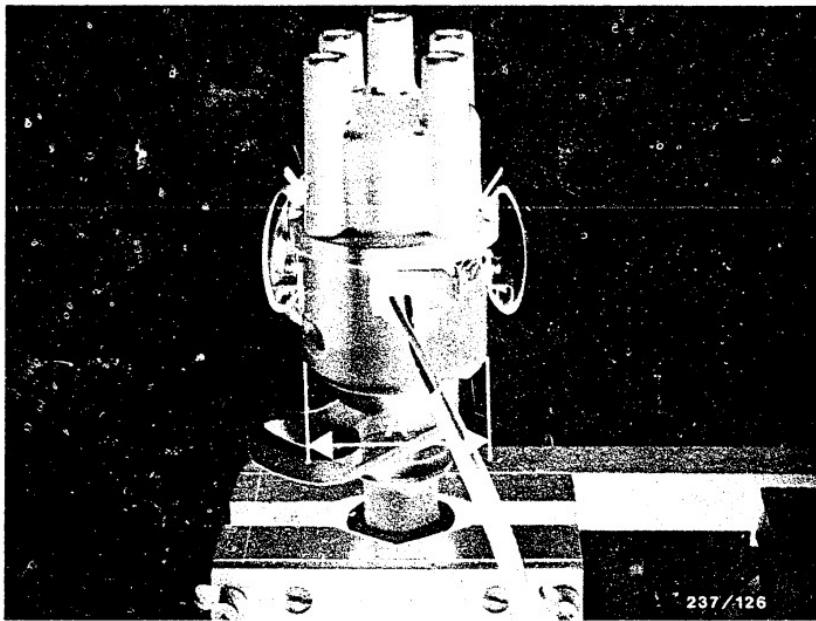
Ignition distributors 0 237..., ZV-I





Lubrication point and lubricant on interference-suppression cover

- 1) Each tower filled with approx. 60 mm³ silicone paste
5 700 083 005



A = Housing diameter

4. Repairing the ignition pulse generator

4.1 Determining the size

Ignition distributors are available at present in 3 sizes.

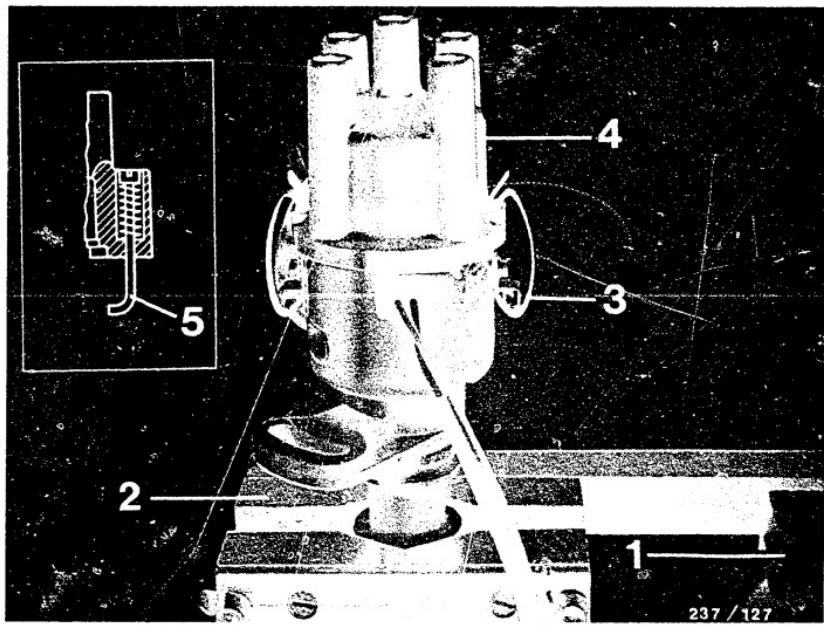
The distinguishing feature is the housing diameter.
Example 65 mm diameter (see picture).

B1

Repair, determining the size

Ignition distributors 0 237..., ZV-I





- 1 = Vise 3 = Holding spring
2 = Clamping fixture 4 = Distributor cap
5 = Retaining pin

4.2 Removing the pulse generator

Clamp the ignition distributor with clamping fixture in a vise.

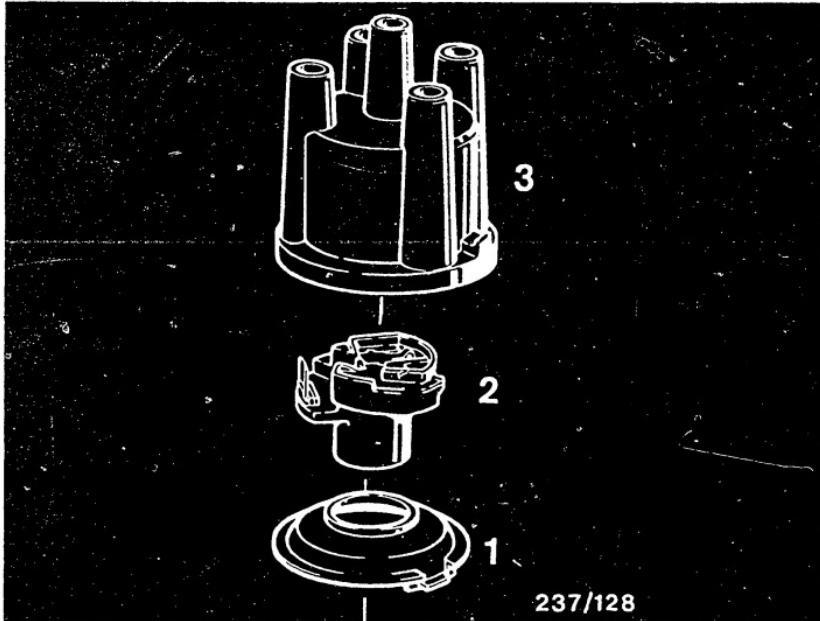
Caution: If clamped without a clamping fixture, the distributor (bearing bushing) will be damaged. Using a screwdriver, release the holding springs (3) or retaining pins (5) from the distributor cap.

B2

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





237/128

- 1 = Dust-protection cover
- 2 = Distributor rotor
- 3 = Distributor cap

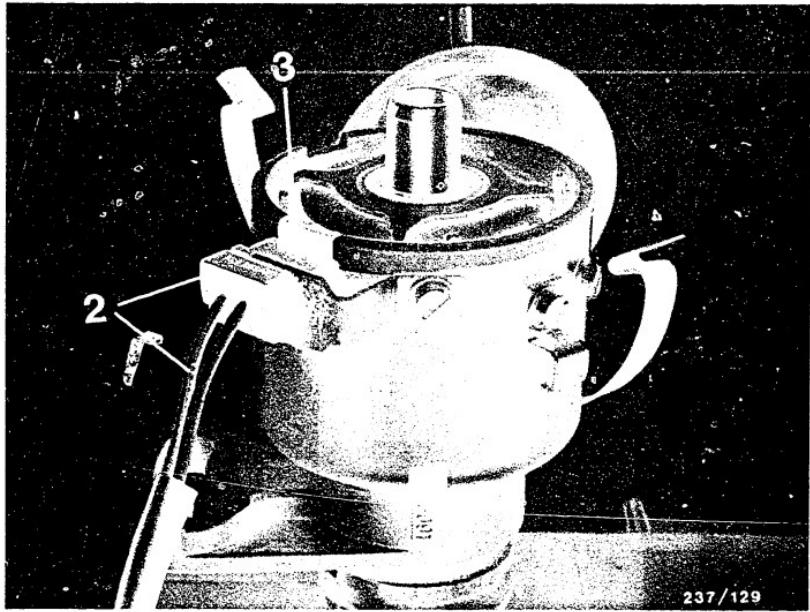
Remove the distributor cap, distributor rotor and dust-protection cover.

B3

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





237/129

- 1 = Retaining bracket
- 2 = Electric leads
- 3 = Socket

Remove the electric lead.

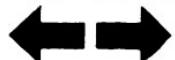
If installed: Unscrew screw from retaining bracket.
Take off retaining bracket.

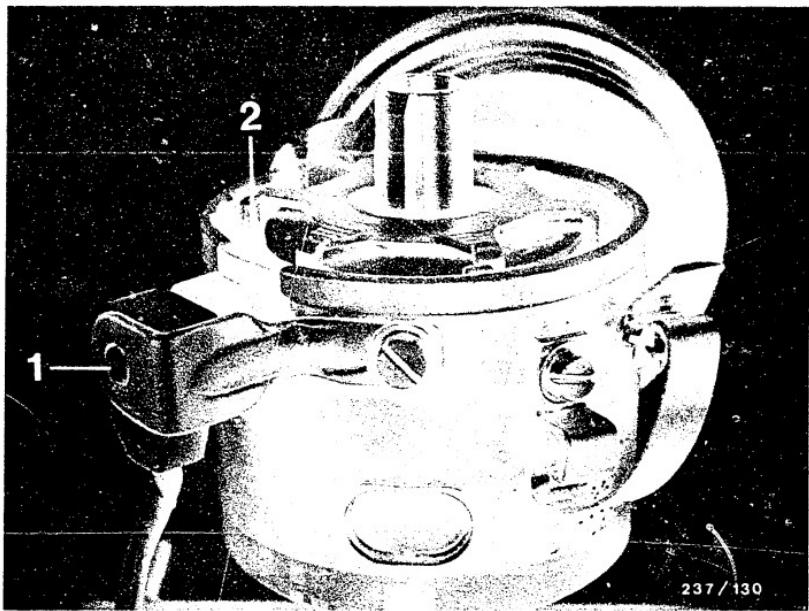
Pull electric leads out of the socket.

B4

Removing the pulse generator

Ignition distributors 0 237..., ZV-I

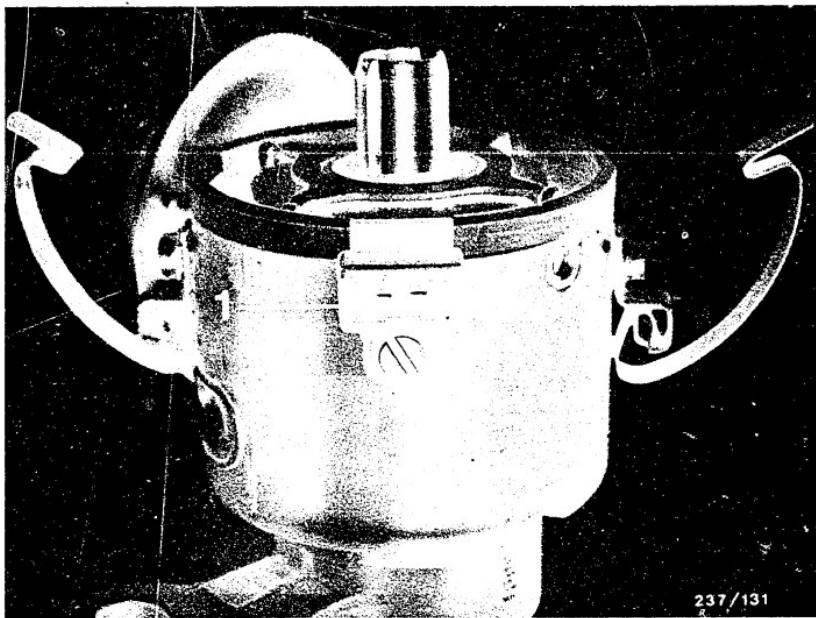




1 = Retaining bracket with electric lead
2 = Socket

Further version of an electric lead

If installed: Unscrew screw from retaining bracket.
Pull retaining bracket with electric lead out of the socket.



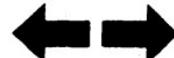
1 = Socket

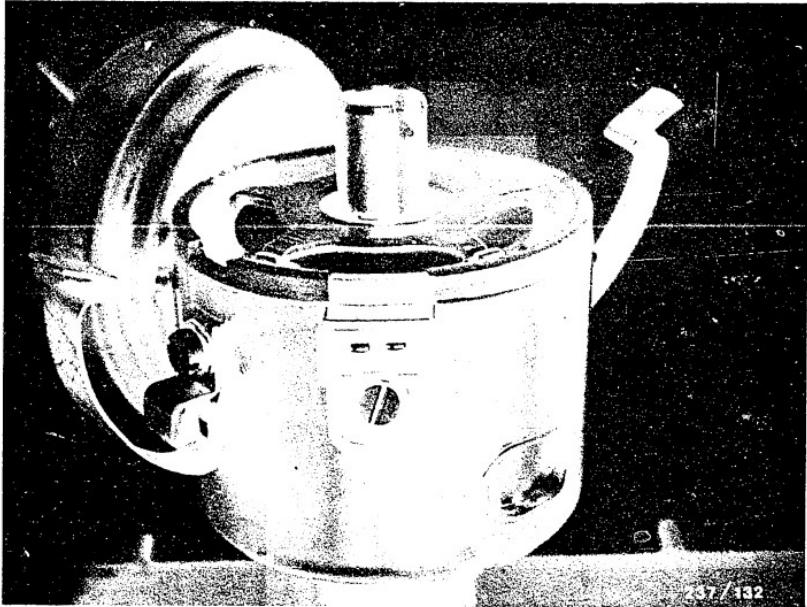
Unscrew fastening screw from socket. Withdraw socket horizontally. Pay attention to rubber seal in socket (can get lost).

B6

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





237 / 132

1 = Socket

Further version of a socket.

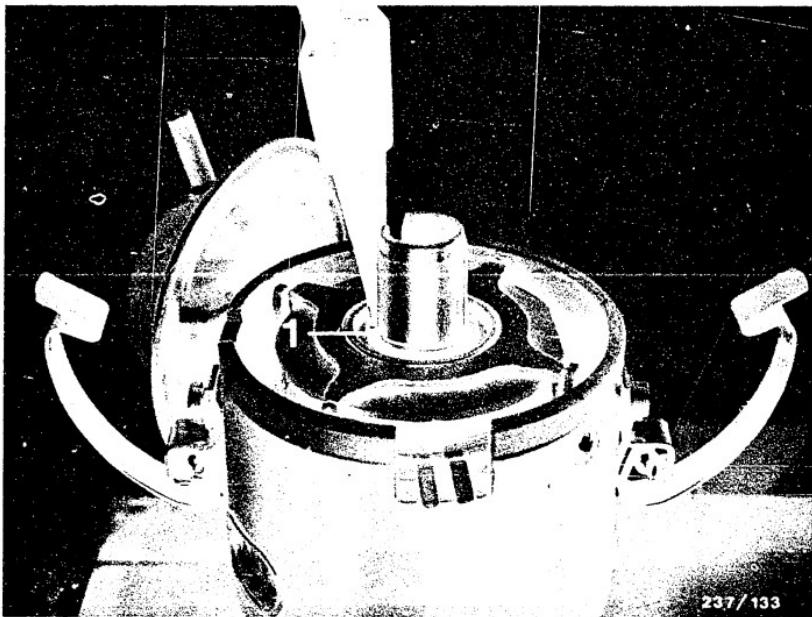
Unscrew fastening screw from socket. Withdraw socket horizontally. Pay attention to rubber seal in socket (can get lost).

B7

Removing the pulse generator

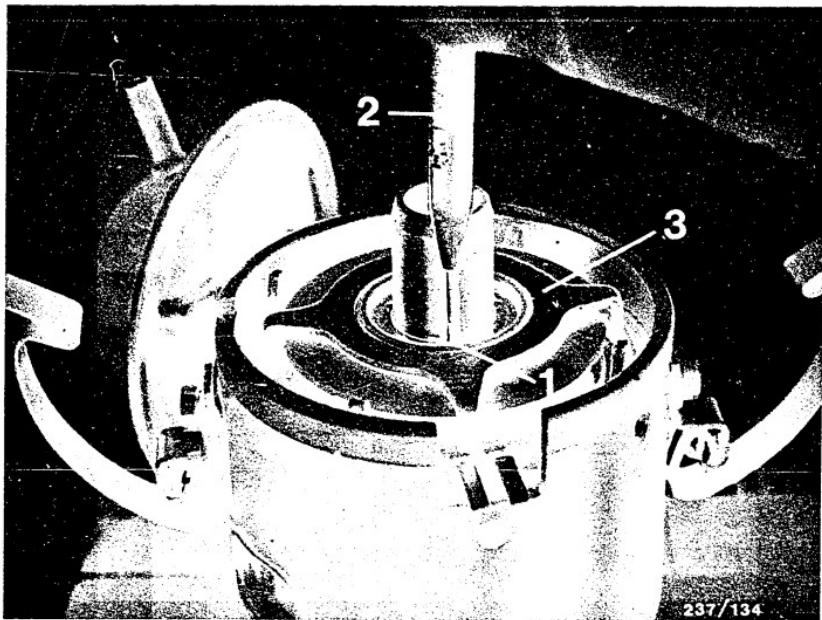
Ignition distributors 0 237..., ZV-I





1 = Retainer

Remove the upper retainer with pliers. Remove the corrugated washer below it, if fitted.



237/134

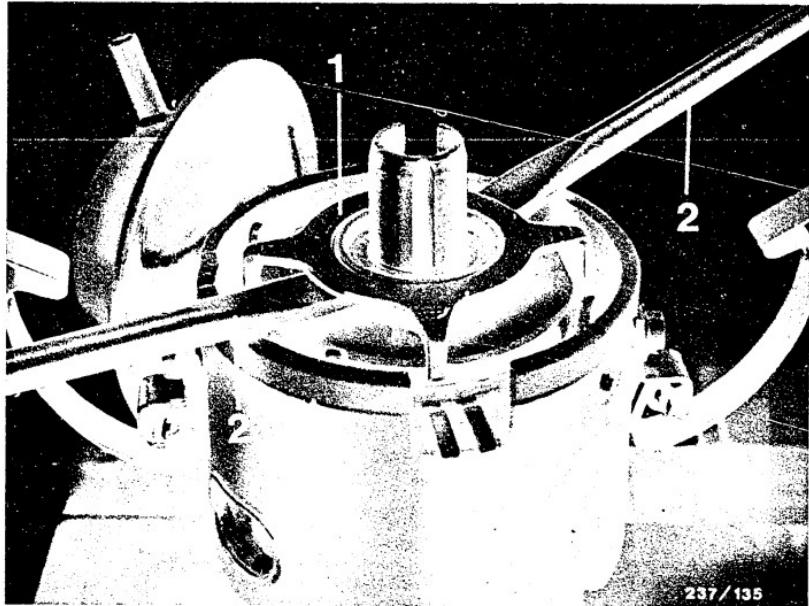
1 = Straight pin

2 = Drift

3 = Trigger wheel

Drive the straight pin downward with a drift approx.
0.5 mm.

Note: This makes it easier to remove (lever off) the
trigger wheel.



237/135

1 = Trigger wheel

2 = Screwdriver

Lever off the trigger wheel with 2 screwdrivers. Apply the screwdrivers on the inside of the trigger wheel (greater stability).

If stiff, give the straight pin another slight tap downward.

Remove the loose straight pin from the ignition distributor (pulse generator).

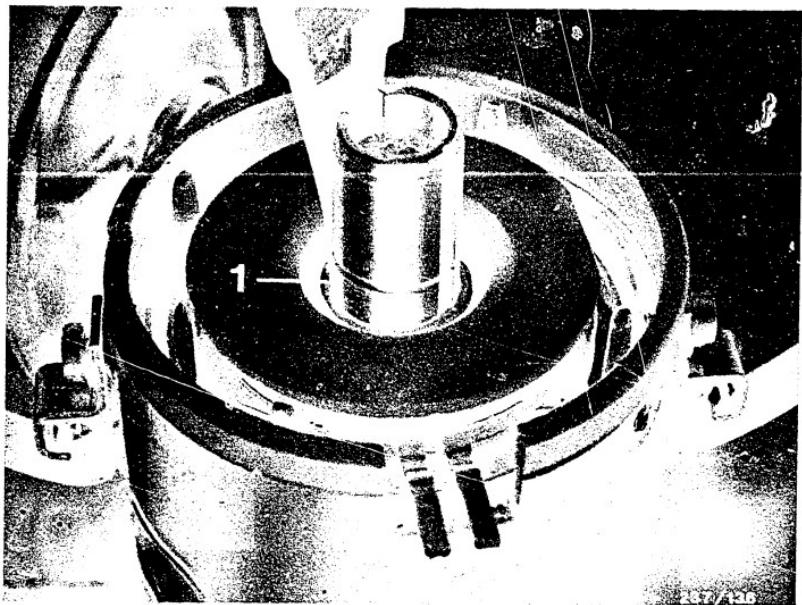
Demolish the trigger wheel and scrap.

B 10

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





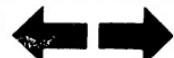
1 = Retainer

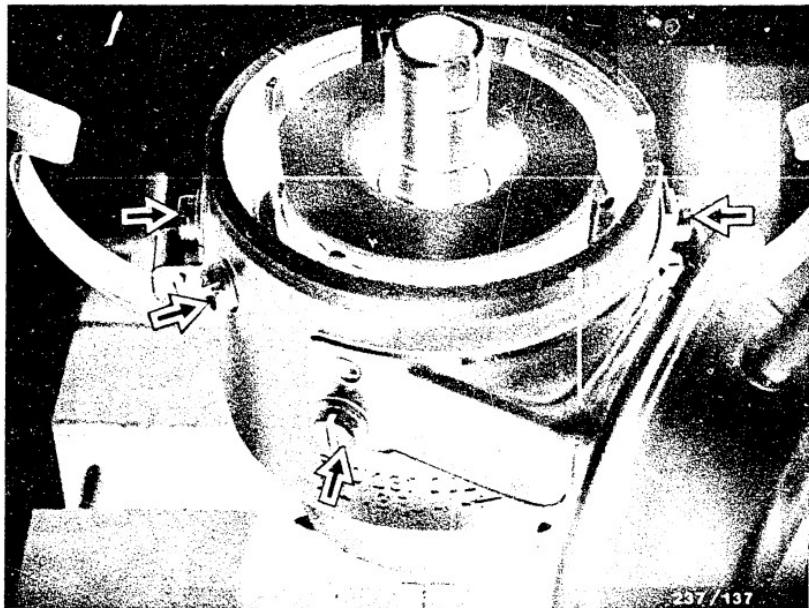
Remove the lower retainer with pliers.

B11

Removing the pulse generator

Ignition distributors 0 237..., ZV-I



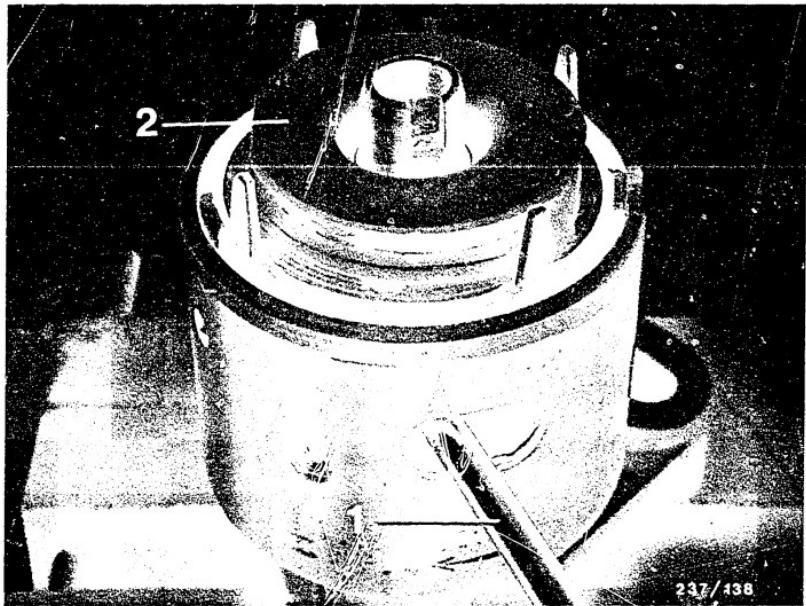


237/137

1 = Vacuum advance mechanism

Unscrew the fastening screws of holding springs, vacuum advance mechanism and pulse generator (see arrows). Lower the vacuum advance mechanism downward and pull out of distributor housing.



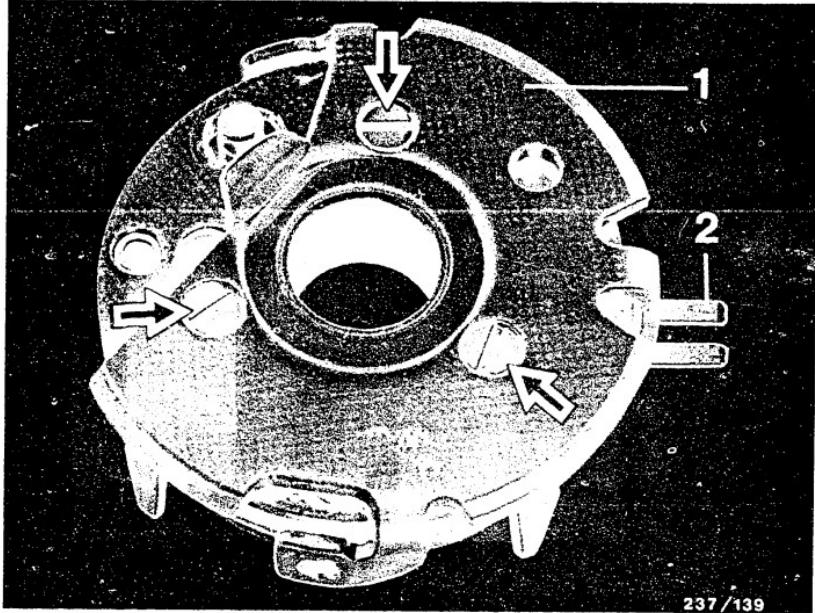


1 = Screwdriver

2 = Pulse generator

Introduce a screwdriver into the opening in the distributor housing (vacuum advance mechanism).

With the aid of the screwdriver, carefully push the pulse generator upward out of the distributor housing.



237 / 139

- 1 = Underside of pulse generator
2 = Coil section

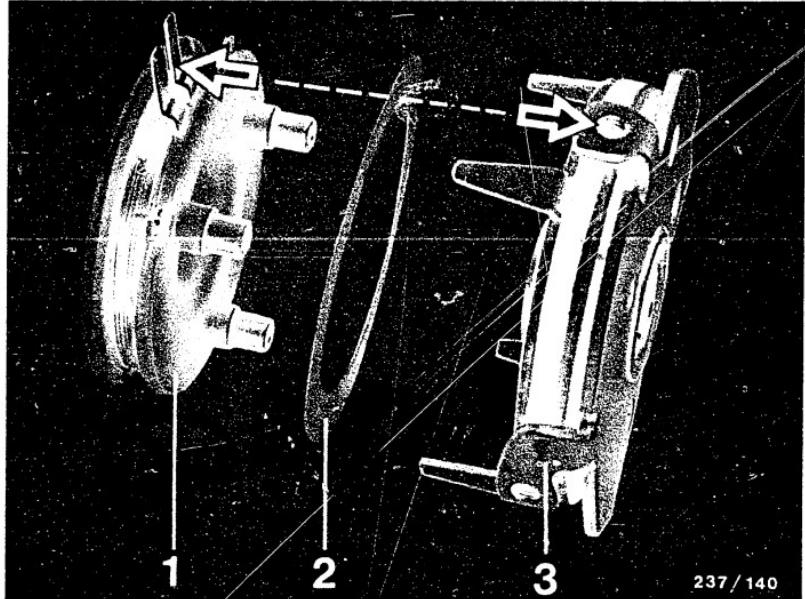
After removing the 3 flat-head screws (arrows) it is possible to remove the coil section.
Note the position of the parts in relation to each other.

B14

Removing the pulse generator

Ignition distributors 0 237..., ZV-I



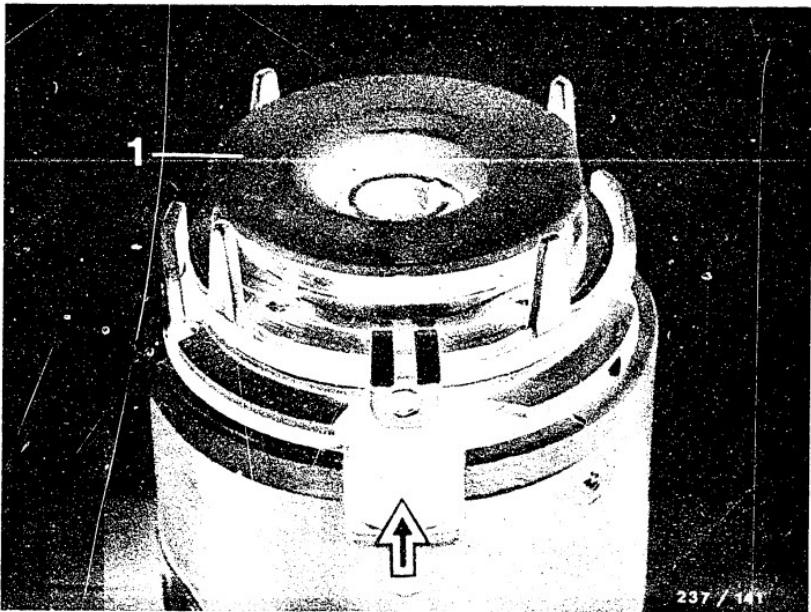


- 1 = Coil section
- 2 = Insulating part
- 3 = Pulse generator

4.3 Installing the pulse generator

Before installing the coil section, make sure that the insulating part is properly located.

Install the coil section so that the two contacts are opposite the narrow (middle) screw bracket of the pulse generator (see picture).



1 = Pulse generator

Install the pulse generator in the distributor housing.

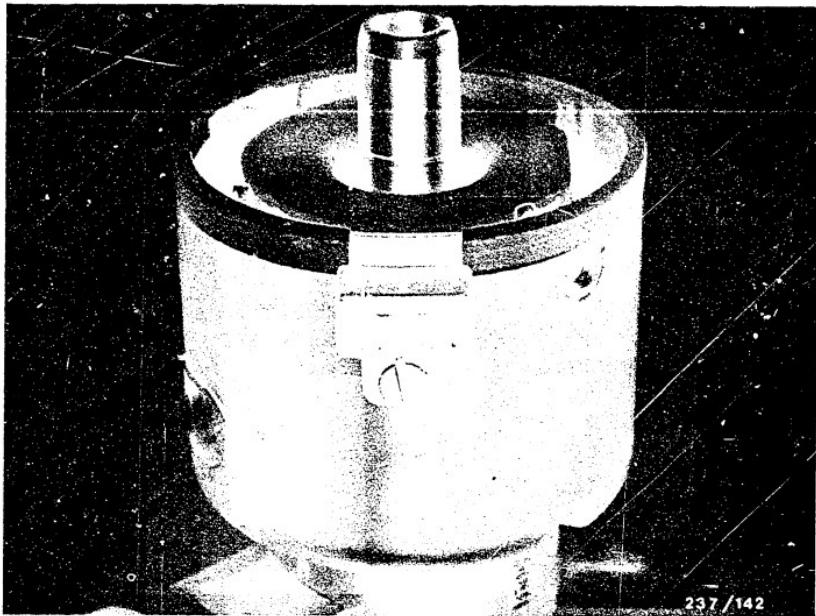
Installation position: Electric terminal of coil section points toward recess in distributor housing (see arrow).

B16

Installing the pulse generator

Ignition distributors 0 237..., ZV-I

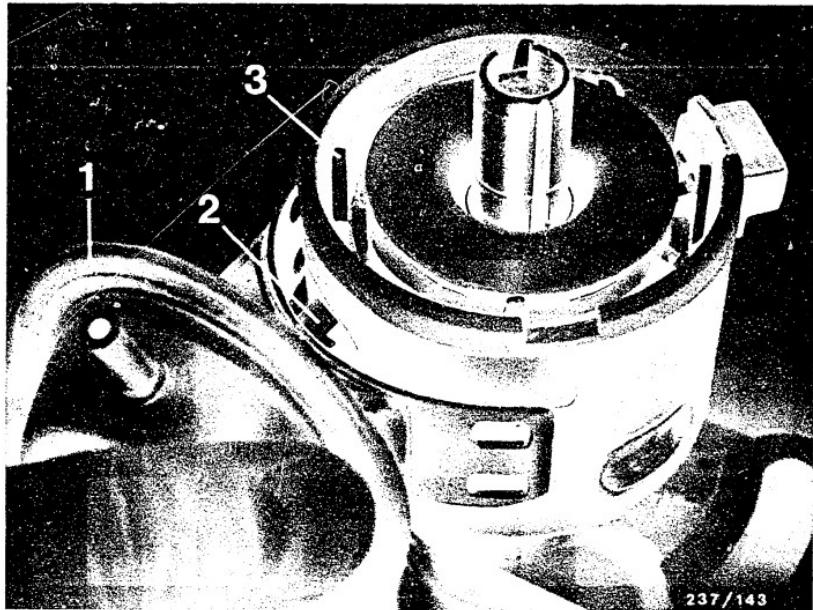




1 = Socket

Insert the socket in the distributor housing. Position the fastening screw and tighten.

Note: Pay attention to the rubber seal in the socket.



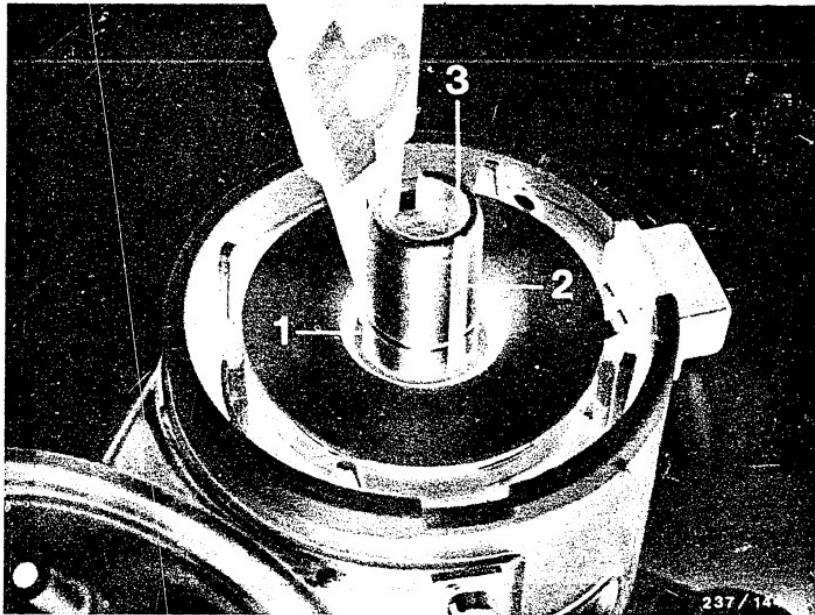
237/143

- 1 = Vacuum advance mechanism
- 2 = Tie rod
- 3 = Teeth of pulse generator

Turn the teeth of the pulse generator against the direction of rotation of the distributor as far as they will go and hold there. Introduce the vacuum advance mechanism into the distributor housing and hook the tie rod into the pulse generator bearing pin.

Before screwing it down, move the vacuum advance mechanism to and fro and check whether the teeth of the pulse generator move.

Position the fastening screws of the vacuum advance mechanism, holding springs and pulse generator, and tighten.



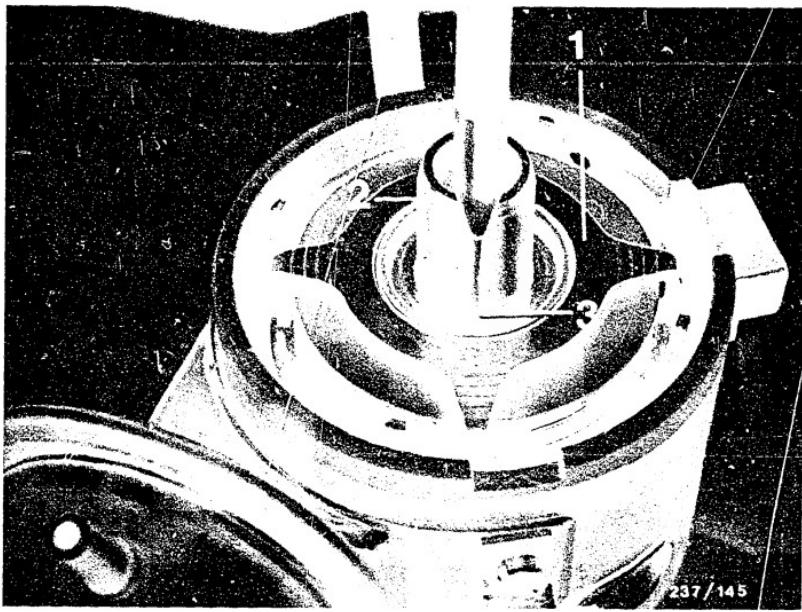
1 = Retainer

2 = Rotor sleeve groove

3 = Rotor sleeve

Install the lower retainer with the opening at 180° to the rotor sleeve groove.

Caution: Make sure that the retainer is latched in position all the way round.



1 = Trigger wheel

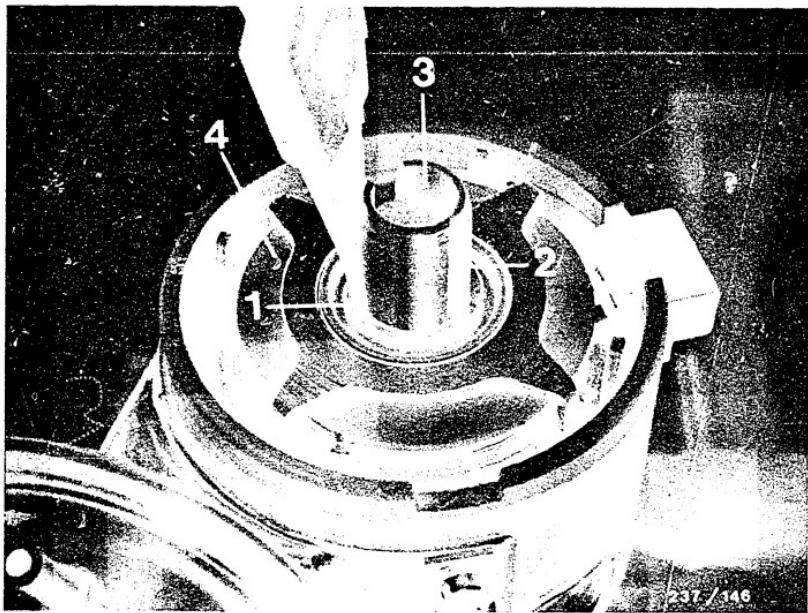
2 = Rotor sleeve

3 = Straight pin

Install the new trigger wheel and push down as far as it will go.

Bring the groove of the trigger wheel and the rotor sleeve into alignment.

Introduce straight pin into groove and drive in using a drift until the straight pin is flush with the trigger wheel.



237 / 146

1 = Retainer

3=Rotor sleeve

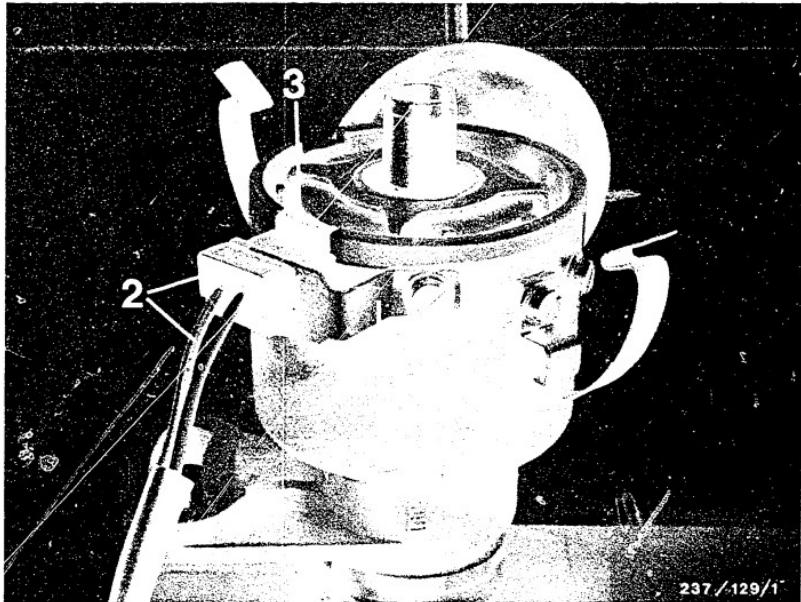
2 = Rotor sleeve groove 4=Pulse generator

If it was previously fitted, install the corrugated washer on the rotor sleeve. Install the upper retainer with the opening at 180° to the rotor sleeve groove.

Caution: Make sure that the retainer is latched in position all the way round.

Turn the distributor shaft by hand.

The trigger wheel must not brush against the pulse generator.

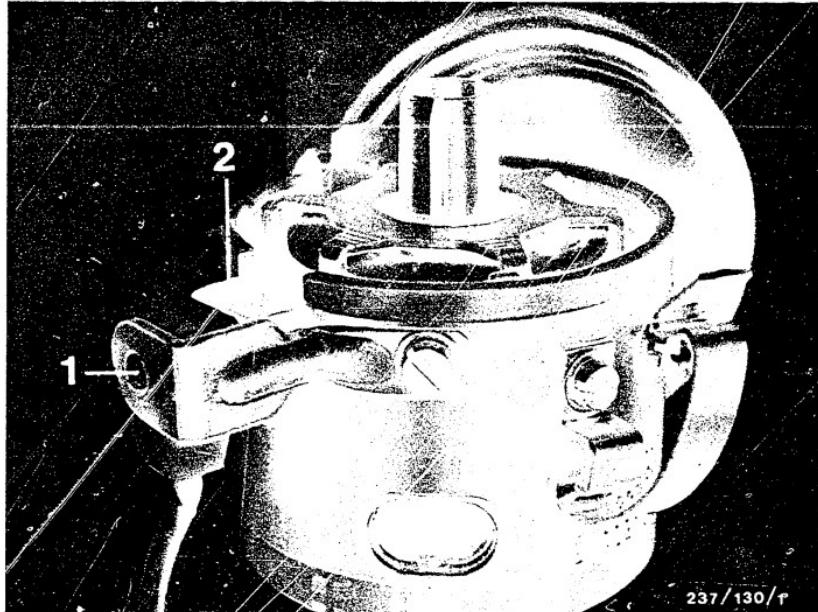


237 / 129 / 1

- 1 = Electric lead
- 2 = Socket
- 3 = Retaining bracket

Insert the electric lead into the socket.
If installed: Screw on the retaining bracket.





1 = Retaining bracket with electric lead

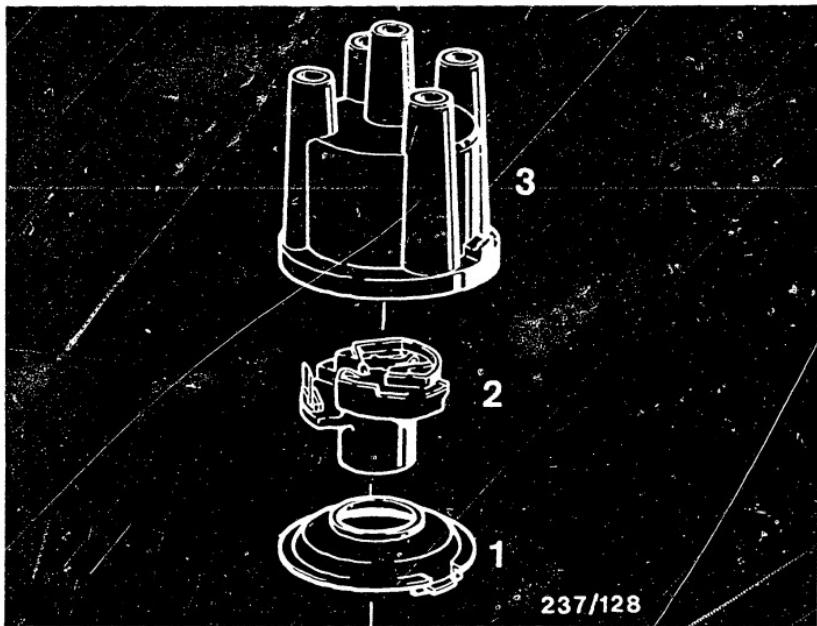
2 = Socket

Further version of an electric lead.

Insert the electric lead in the socket.

If installed: Screw on the retaining bracket.





237/128

- 1 = Dust-protection cover
- 2 = Distributor rotor
- 3 = Distributor cap

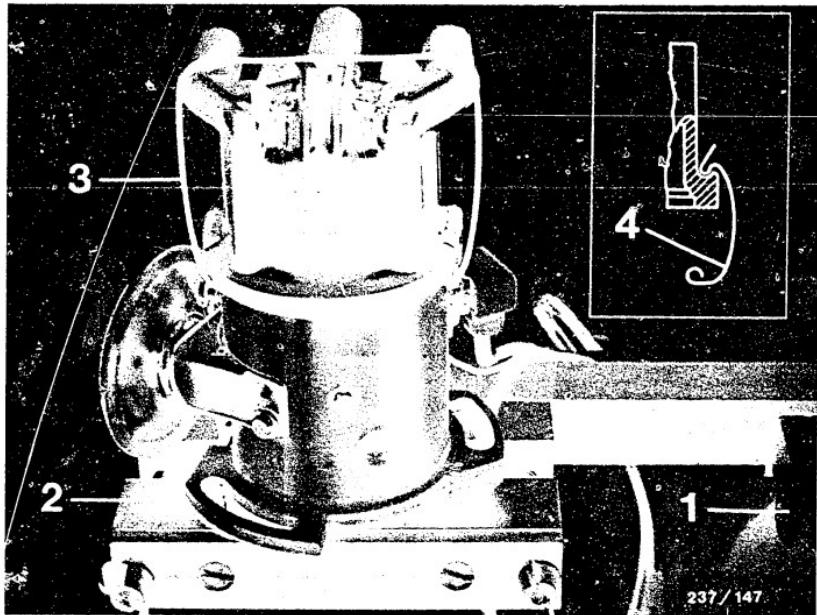
Install the dust-protection cover, distributor rotor and distributor cap.

B24

Installing the pulse generator

Ignition distributors 0 237..., ZV-I





237/147

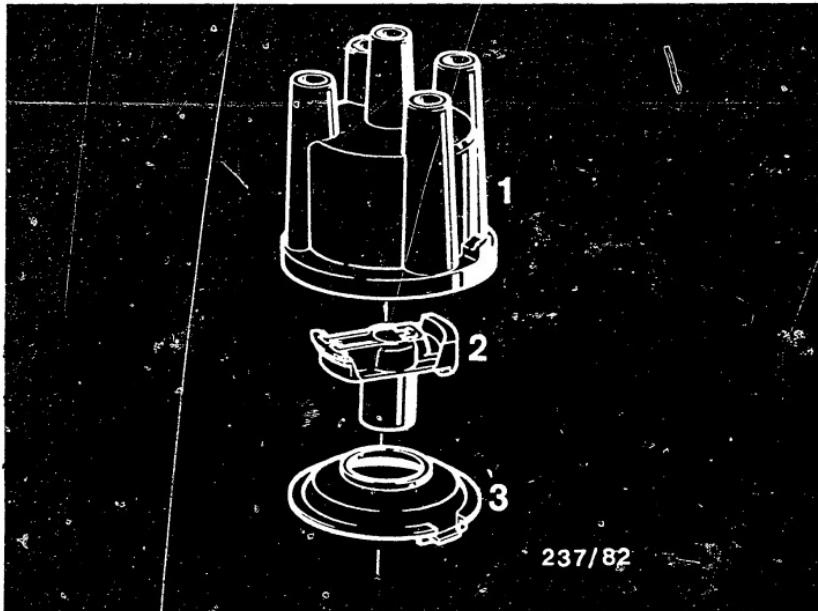
- 1 = Vise 3 = Clamping saddle
 2 = Clamping fixture 4 = Holding spring

5. Repairing the pulse generator - short-type ignition distributors

5.1 Removing the pulse generator

Clamp the ignition distributor by hand in the clamping fixture.

Caution: If clamped without a clamping fixture, the ignition distributor (bearing bushing) will be damaged. Using a screwdriver, release the clamping saddles (3) or holding springs (4) from the distributor cap.



237/82

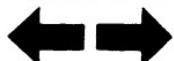
- 1 = Distributor cap
- 2 = Distributor rotor
- 3 = Dust-protection cover

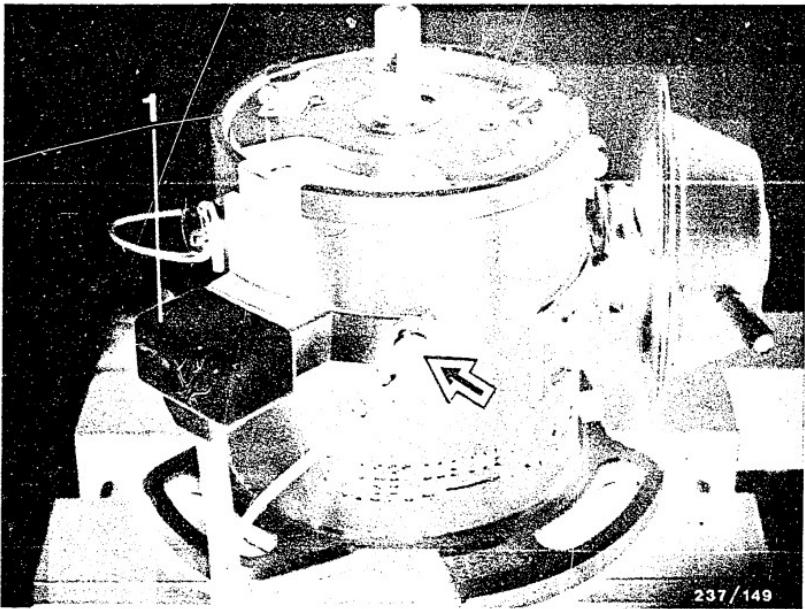
Remove the distributor cap, distributor rotor and dust-protection cover.

C2

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





237/149

1 = Retaining bracket with electric lead

2 = Socket

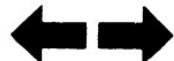
Remove the electric lead.

If installed: Unscrew fastening screw from retaining bracket (arrow).

Pull retaining bracket with electric lead out of the socket.

C3

Removing the pulse generator
Ignition distributors 0 237..., ZV-I





237/150

1 = Socket

2 = Bearing end plate

Unscrew fastening screw from socket.

Withdraw socket horizontally.

Pay attention to rubber seal in socket (can get lost).

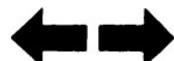
Loosen screws in bearing end plate (captive screws).

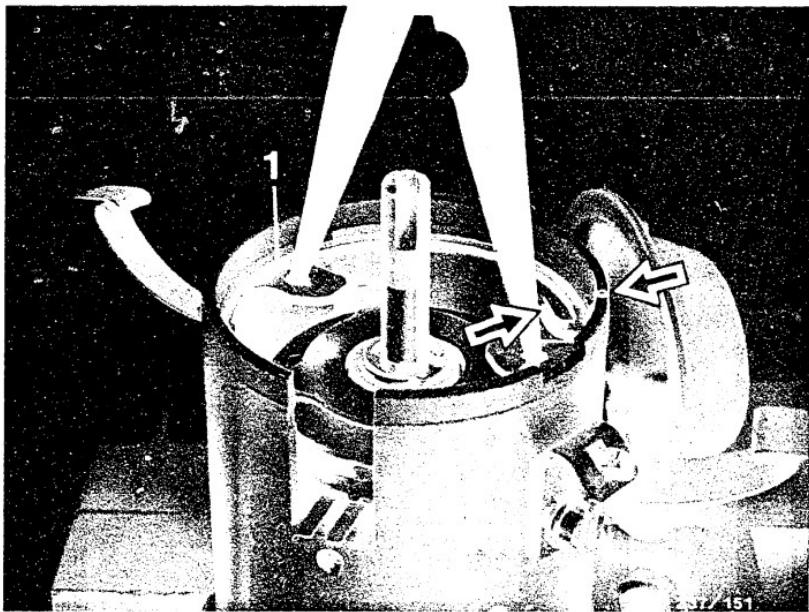
Take off bearing end plate.

C4

Removing the pulse generator

Ignition distributors 0 237..., ZV-I



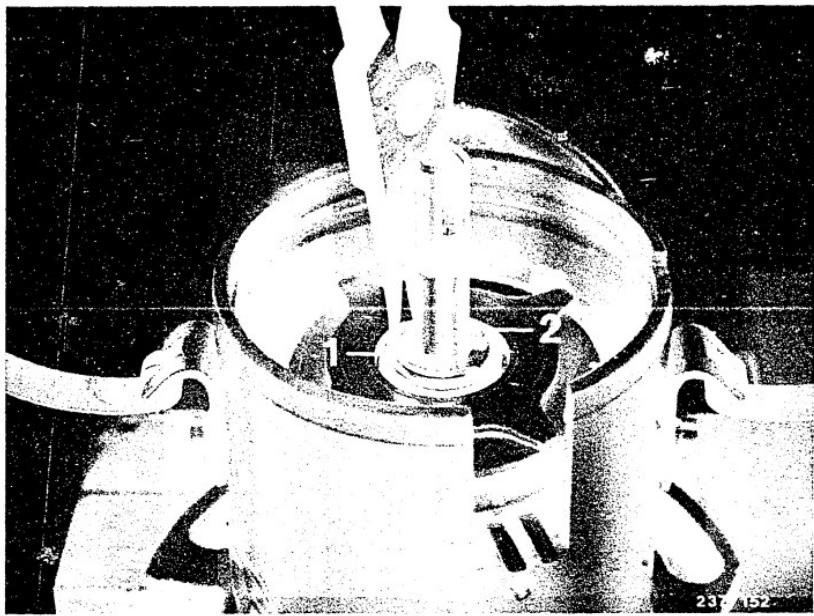


1 = Clamping ring

Mark the position of the clamping ring on the distributor housing (see arrow).

Note: The clamping ring can be turned 360°.

Remove clamping ring with pliers.



237 152

1 = Retainer

2 = Retainer

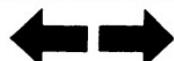
Remove retainer Item 1 and corrugated washer if fitted.

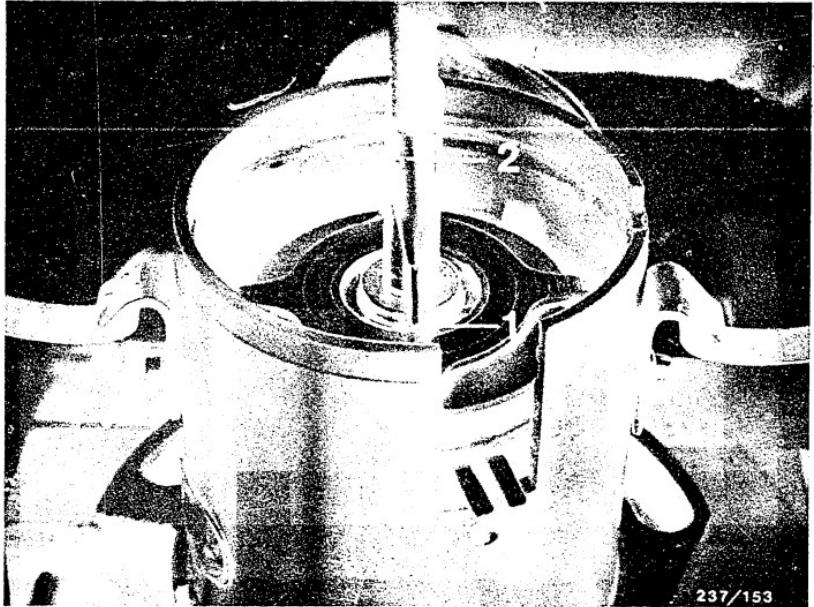
Remove retainer Item 2.

C6

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





1 = Straight pin
2 = Drift

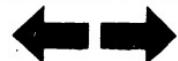
Using a drift approx. 0.5 mm, drive the straight pin downward.

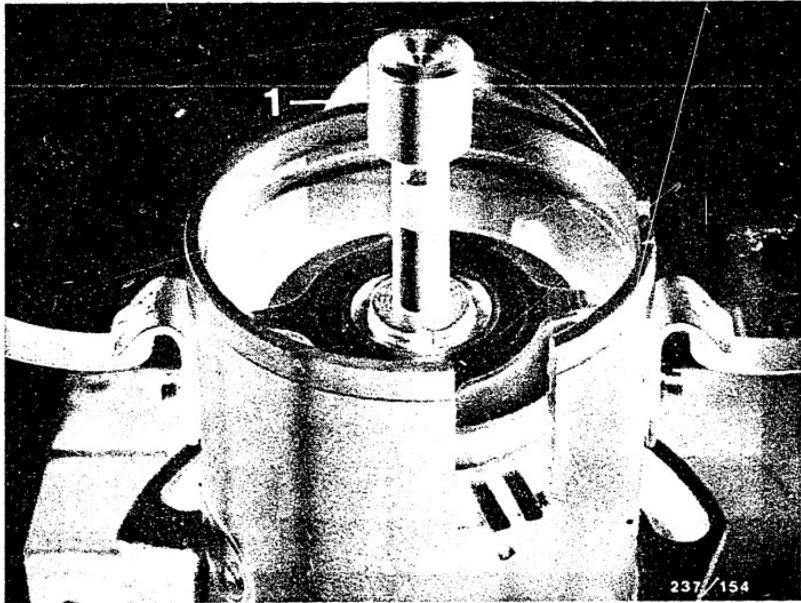
This makes it easier to remove the trigger wheel.

C7

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





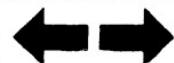
1 = Pressure piece

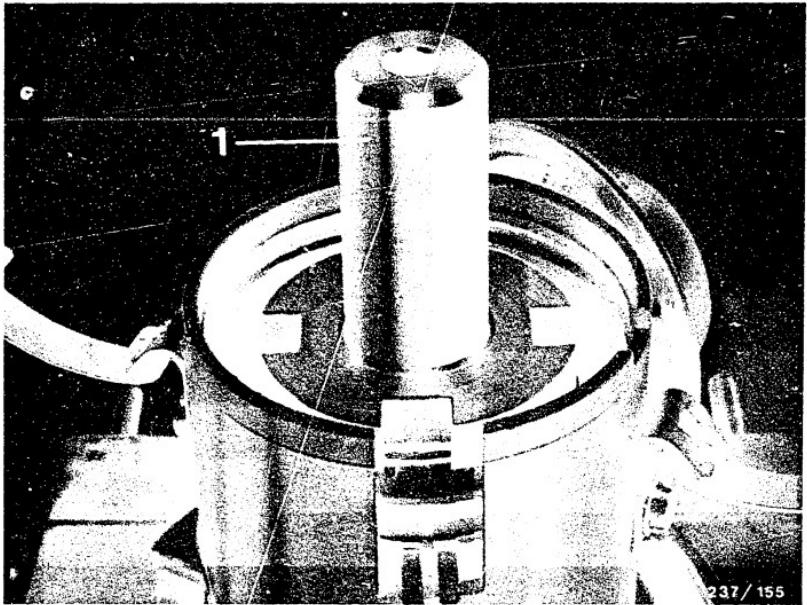
Position the pressure piece of the puller on the distributor shaft.

C8

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





237 / 155

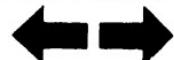
1 = Support ring

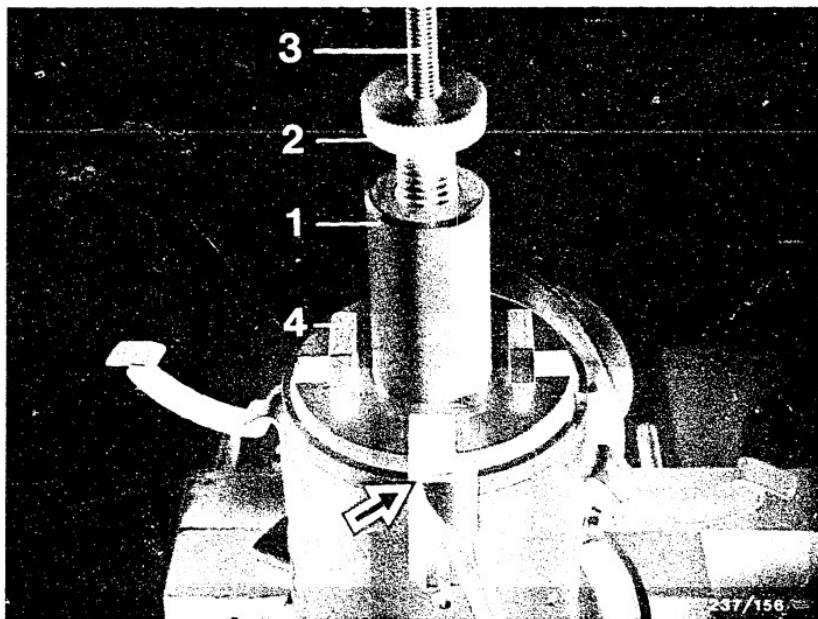
Position the support ring on the trigger wheel.

C9

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





237/156

1 = Extractor sleeve

2 = Hollow screw

3 = Hexagon screw

4 = Extractor hook

Position the extractor sleeve, and screw back the hollow screw and hexagon screw.

Using a screwdriver, lift the trigger wheel approx. 2 mm (see arrow).

Insert 3 extractor hooks through recess of extractor sleeve and push inward.

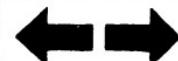
Remove screwdriver and insert 4th extractor hook.

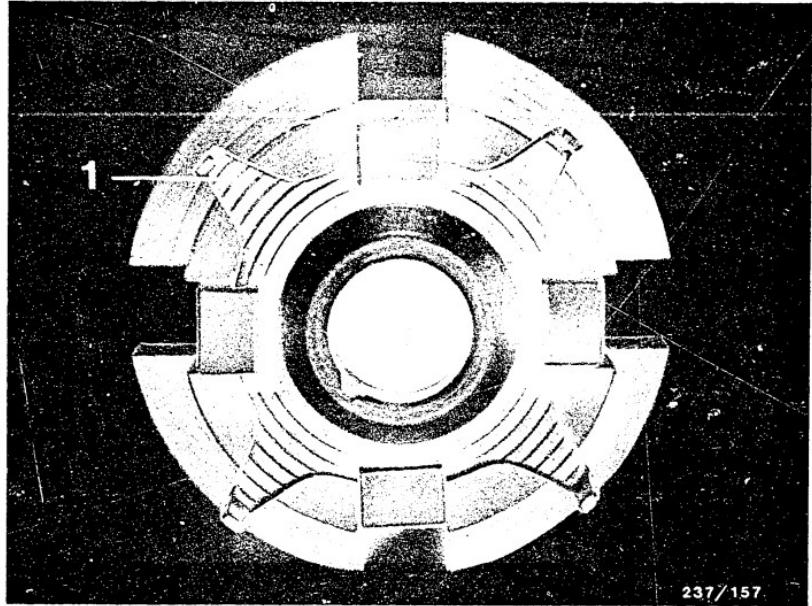
Tighten hollow screw by hand (until resistance can be felt).

C10

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





237/157

1 = Trigger wheel (seen from below)

By turning the hexagon screw in a clockwise direction,
remove the trigger wheel.

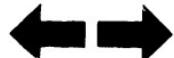
Remove the loose straight pin from the distributor
(pulse generator).

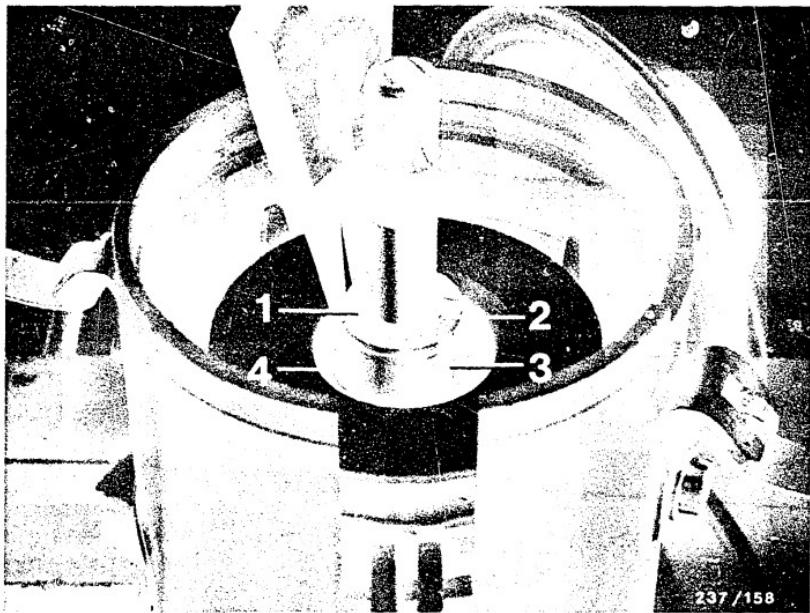
Demolish the trigger wheel and scrap.

C11

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





1 = Retainer

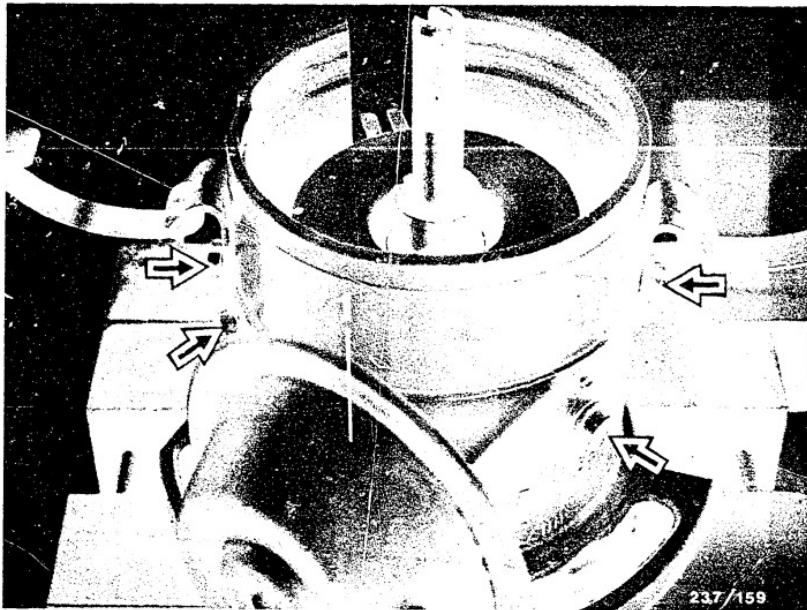
2 = Rotor sleeve

3 = Rotor sleeve groove

4 = Retainer

Re-install the retainer (Item 1) with the opening to the rotor sleeve groove on the distributor shaft.

Remove the retainer (Item 4) with pliers.



1 = Vacuum advance mechanism

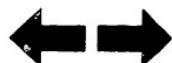
Unscrew the screws for holding springs, vacuum advance mechanism and pulse generator (see arrows).

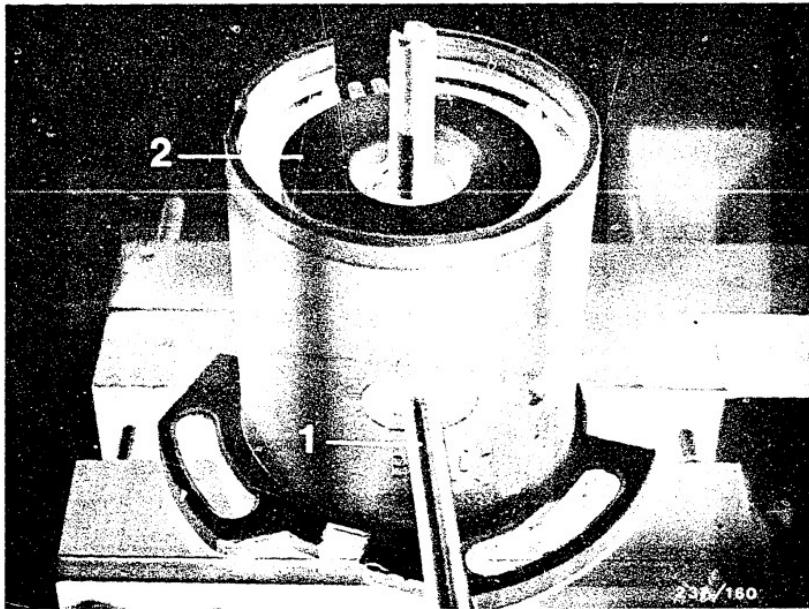
Lower the vacuum advance mechanism downward and pull out of the distributor housing.

C13

Removing the pulse generator

Ignition distributors 0 237..., ZV-I



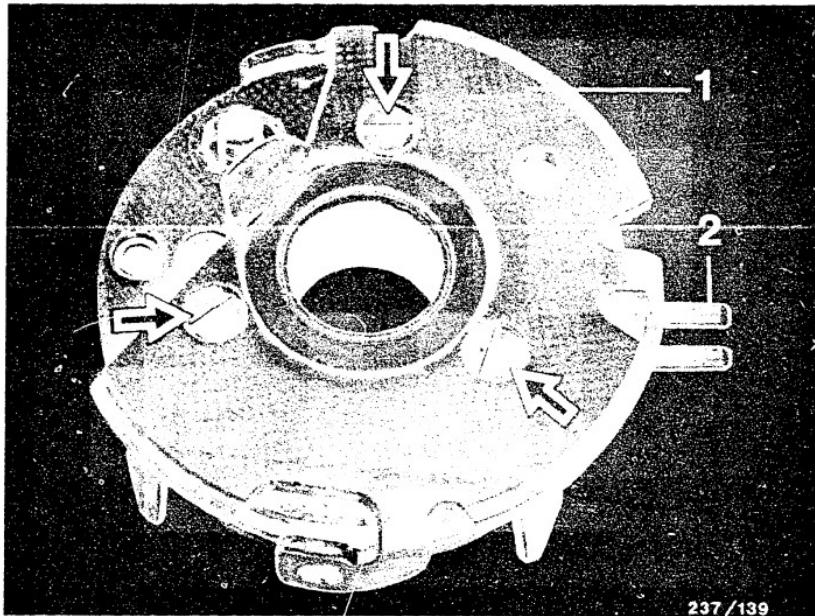


1 = Screwdriver

2 = Pulse generator

Introduce the screwdriver into the opening in the distributor housing (vacuum advance mechanism).

With the aid of the screwdriver, carefully push the pulse generator upward out of the distributor housing.



237/139

1 = Underside of pulse generator

2 = Coil section

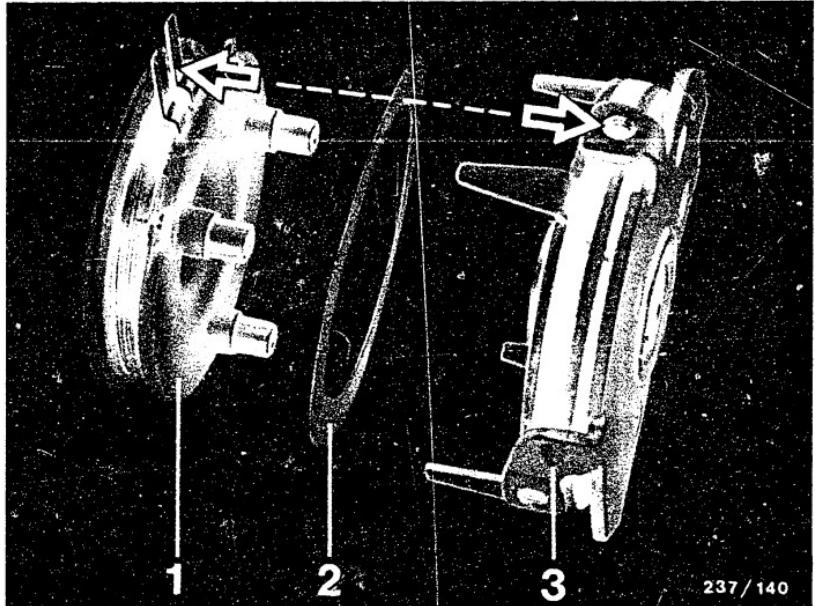
After removing the 3 flat-head screws (arrows) it is possible to remove the coil section.
Note the position of the parts in relation to each other.

C15

Removing the pulse generator

Ignition distributors 0 237..., ZV-I





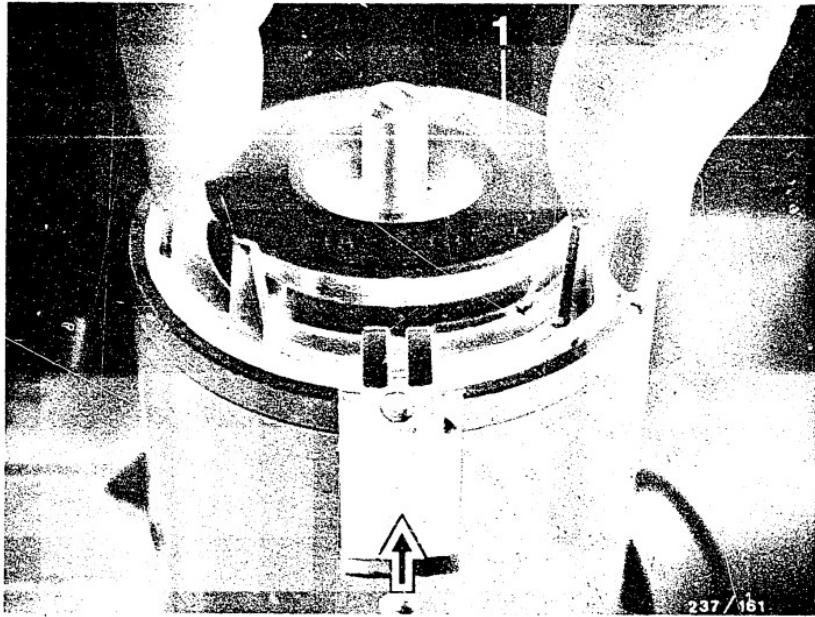
237/140

- 1 = Coil section
- 2 = Insulating part
- 3 = Pulse generator

5.2 Installing the pulse generator

Before installing the coil section, make sure that the insulating part is properly located.

Install the coil section so that the two contacts are opposite the narrow (middle) screw bracket of the pulse generator (see picture).



237 / 161

1 = Pulse generator

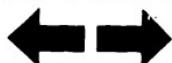
Insert the pulse generator in the distributor housing.

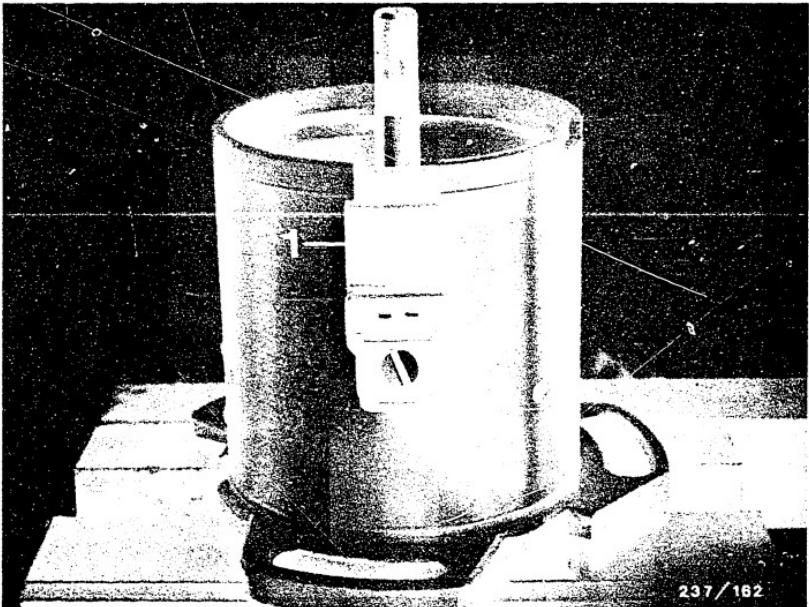
Installation position: Electric terminal of coil section points toward the recess in the distributor housing (see arrow).

C17

Installing the pulse generator

Ignition distributors 0 237..., ZV-I

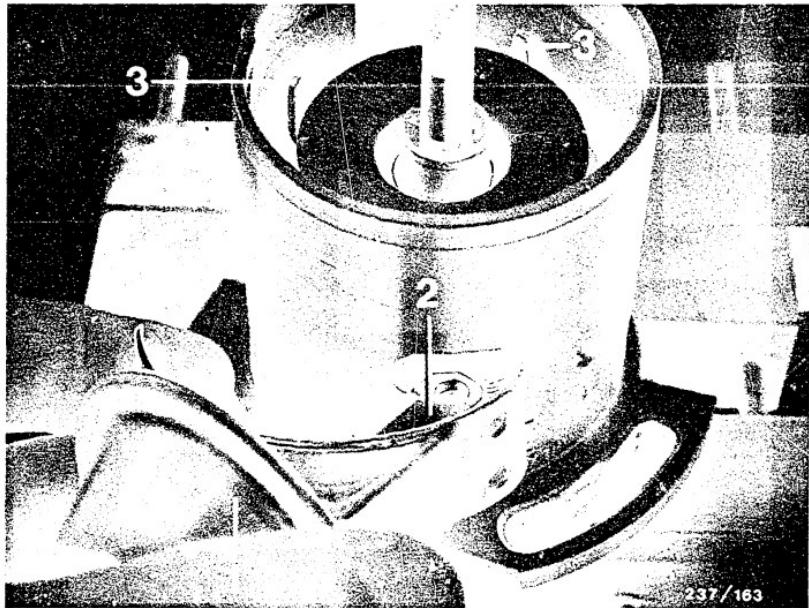




1 = Socket

Insert the socket in the distributor housing.
Position the fastening screw and tighten.

Note: Pay attention to rubber seal in socket.



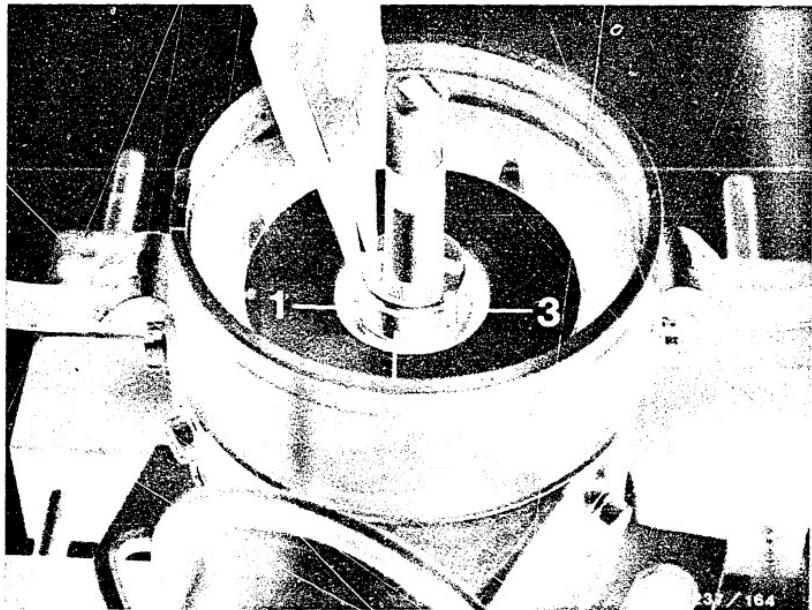
237/163

- 1 = Vacuum advance mechanism
- 2 = Tie rod
- 3 = Teeth of pulse generator

Turn the teeth of the pulse generator against the direction of rotation of the distributor as far as they will go and hold there. Introduce the vacuum advance mechanism into the distributor housing and hook the tie rod into the pulse generator bearing pin.

Before screwing it down, move the vacuum advance mechanism to and fro and check whether the teeth of the pulse generator move.

Position the fastening screws of the vacuum advance mechanism, holding springs and pulse generator, and tighten.



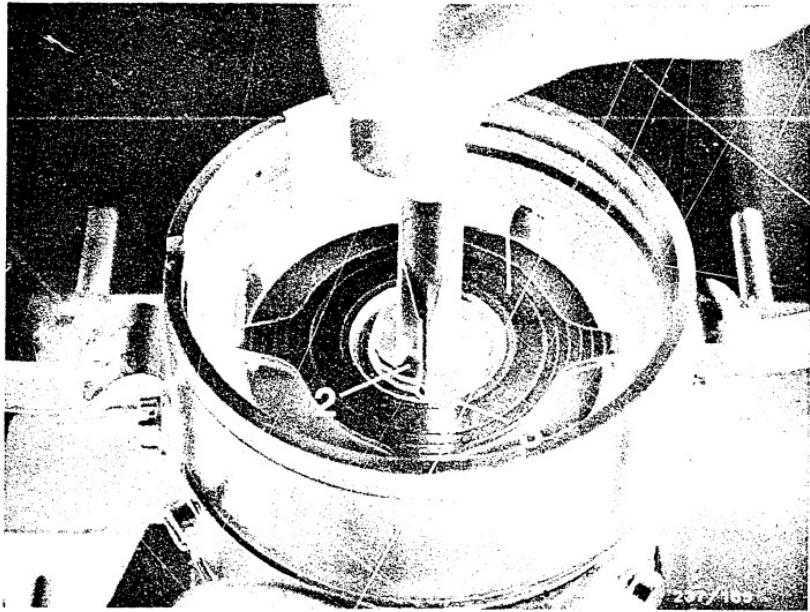
1 = Retainer

2 = Rotor sleeve

3 = Rotor sleeve groove

Install the lower retainer with the opening at 180° to the rotor sleeve groove.

Caution: Make sure that the retainer is latched in position all the way round.

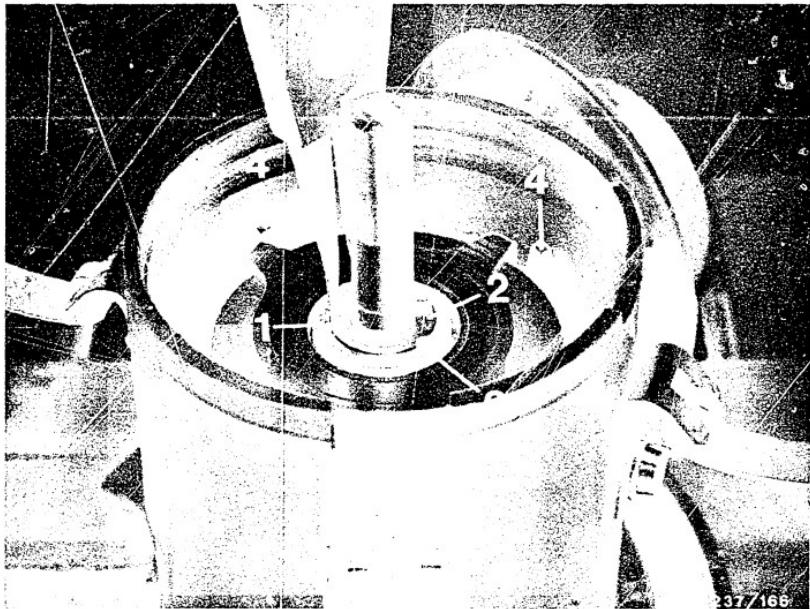


- 1 = Trigger wheel
- 2 = Rotor sleeve
- 3 = Straight pin

Install the new trigger wheel and push down as far as it will go.

Bring the groove of the trigger wheel and the rotor sleeve into alignment.

Introduce straight pin into groove and drive in using a drift until the straight pin is flush with the trigger wheel.



1 = Retainer

2 = Rotor sleeve

3 = Rotor sleeve groove

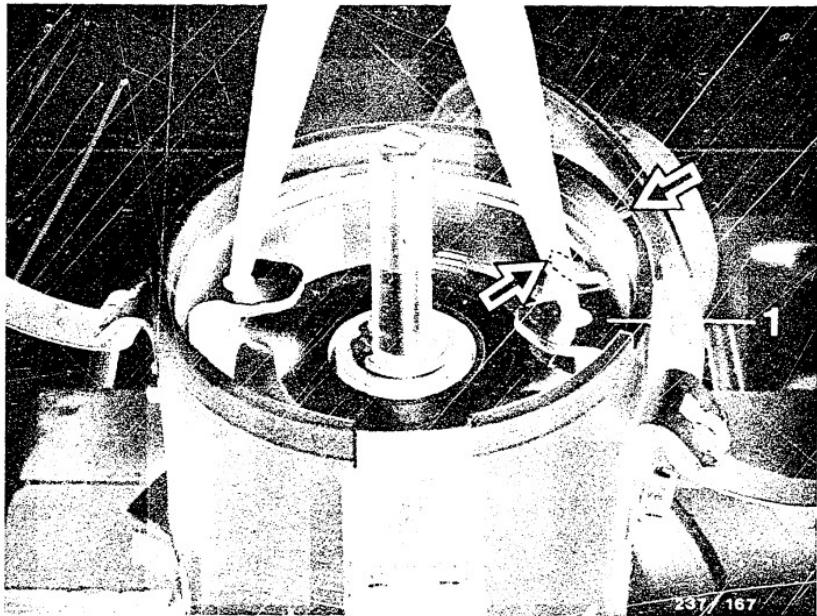
4 = Pulse generator

If previously fitted, slip corrugated washer onto rotor sleeve.

Install the upper retainer with the opening at 180° to the rotor sleeve groove.

Caution: Make sure that the retainer is latched in position all the way round.

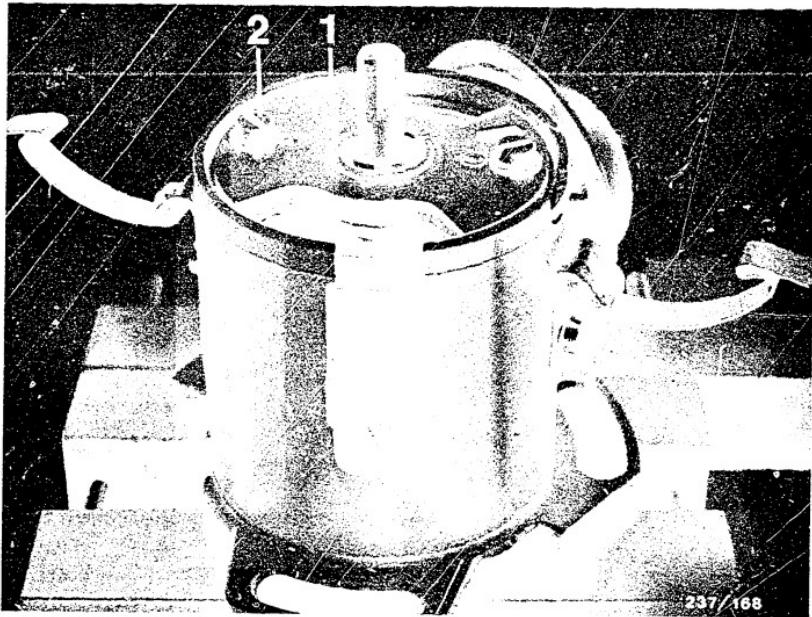
Turn the distributor shaft by hand. Trigger wheel must not brush against the pulse generator.



1 = Clamping ring

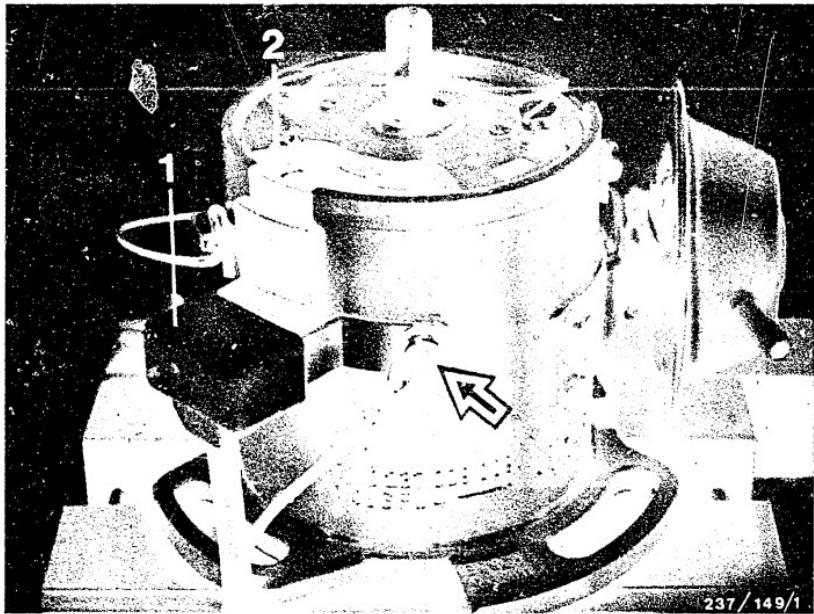
Insert clamping ring with pliers.

Note installation position of the clamping ring (mark).



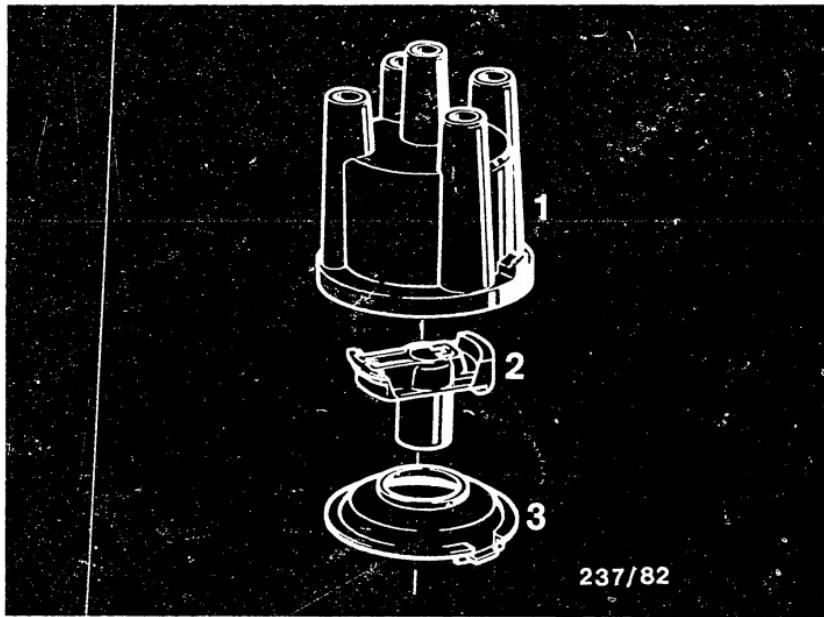
- 1 = Bearing end plate
2 = Fastening screws

Mount the bearing end plate. Tighten the fastening screws.



1 = Retaining bracket with electric lead
2 = Socket

Insert the electric lead into the socket.
If installed: Screw on the retaining bracket (arrow).



237/82

- 1 = Distributor cap
- 2 = Distributor rotor
- 3 = Dust-protection cover

Install the dust-protection cover, distributor rotor and distributor cap.

D2

Installing the pulse generator

Ignition distributors 0 237..., ZV-I



6. Testing

6.1 Test instructions

All speeds given in the test specifications W 237/1001
... refer to the drive shaft of the ignition distributor.
The direction of rotation of the distributor (viewed
looking down on the distributor cap) is given in the
type designation, e.g.

JG FU 4 ← = Clockwise rotation → = Counterclockwise
rotation

or

Z 514 ← = Clockwise rotation → = Counterclockwise
rotation

Caution:

The distributor shaft may only be driven (by hand or
test bench) if the dust-protection cover is in position
(otherwise danger that pulse generator will be de-
stroyed).

Be very careful when working with an open ignition dis-
tributor. No metal chips must be allowed to enter the
magnetic pulse generator system (the air gap could be
bridged by a metal chip).

The ignition distributor may only be driven with the
drive pinion or coupling mounted in place (incorrect
measurements can result from excessive longitudinal
play in the distributor shaft).

Perform the measurements at room temperature and at the
stated voltages.



6.2 Visual examination

Remove the distributor cap, dust-protection cover and distributor rotor.

The distributor cap and distributor rotor must be clean and must have no cracks or leakage paths.

The electric lead must not be damaged; the original lead must be installed.

Check the connection of the lead on the distributor for security.

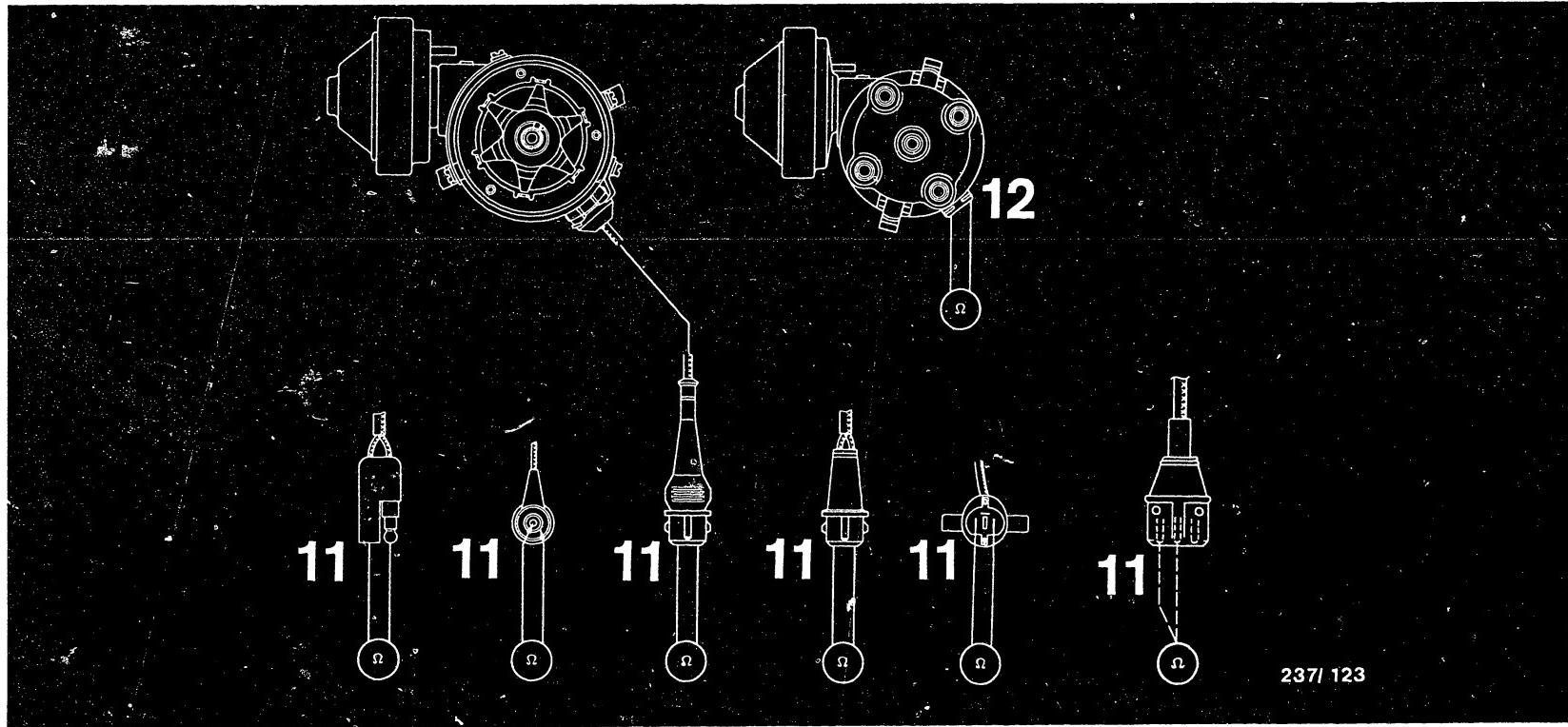
The trigger wheel and the pulse generator must not have any detectable damage. It must be possible to turn the distributor shaft by hand. When the distributor shaft is turned, the trigger wheel must not brush against the pulse generator.

D4

Testing

Ignition distributors 0 237..., ZV-I





237/ 123

11 = Different distributor connectors

12 = Distributor socket

6.3 Testing the coil section (test specifications W 237/1001...)

Test the coil section including electric lead and socket with an ohmmeter (see picture for examples) at room temperature ($15^{\circ}\dots40^{\circ}\text{C}$). Temperature has a considerable effect on measured value.

If test specifications are not reached or if there is an open circuit, the electric lead must be unscrewed from the distributor housing and the pulse generator as well as the electric lead must be tested individually.

D5

Testing

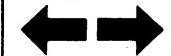
Ignition distributors 0 237..., ZV-I

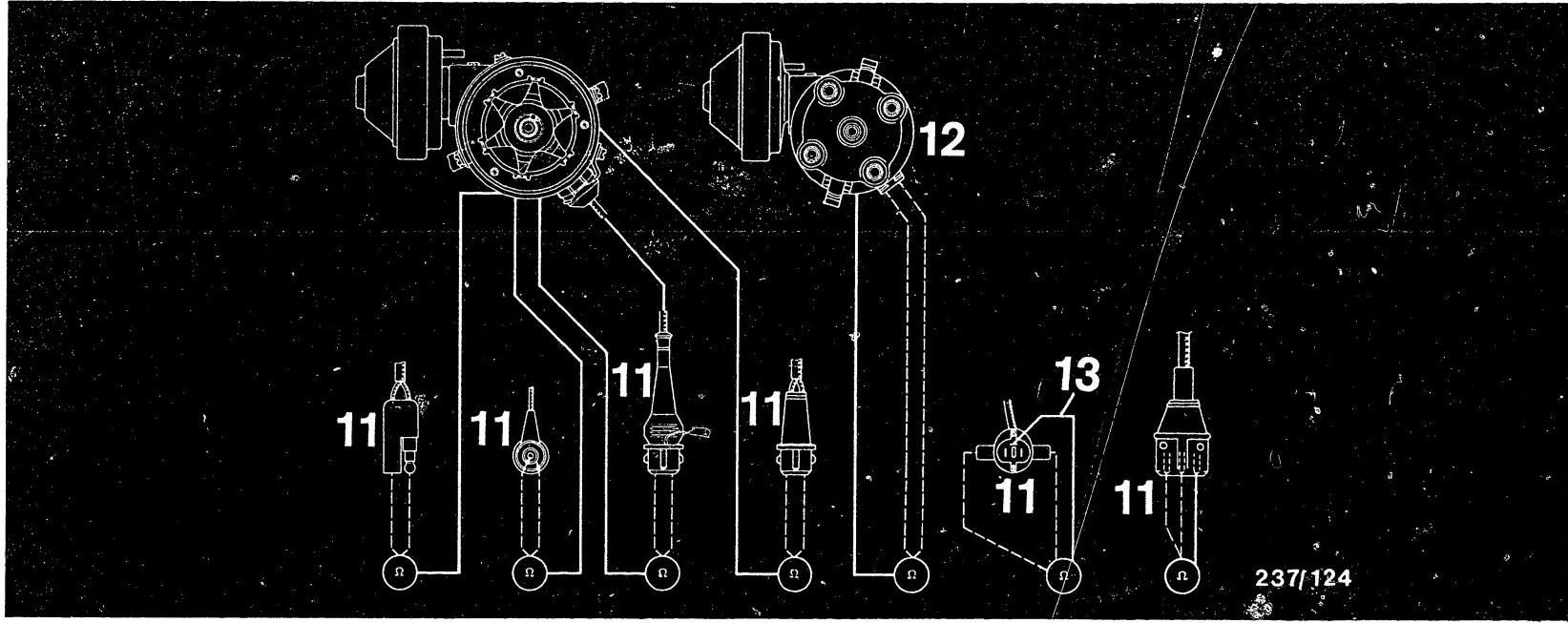


D6

Testing

Ignition distributors 0 237..., ZV-I





11 = Different distributor connectors

12 = Distributor socket

13 = Ground

6.4 Testing for short circuit to ground in the coil section including connecting cable (not given in test specifications)

Connect one terminal of the ohmmeter to the distributor housing (ground).

Connect the other ohmmeter terminal to a contact of the electric lead or socket (see diagrams).

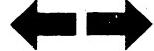
The ohmmeter must indicate ∞ (infinity).

Note: A pulse generator with a short circuit to ground has an effect on the overall operation of the ignition system (pulse generator minimum voltage, ignition timing as well as secondary available voltage).

D7

Testing

Ignition distributors 0 237..., ZV-I



D8

Testing

Ignition distributors 0 237..., ZV-I



237/124

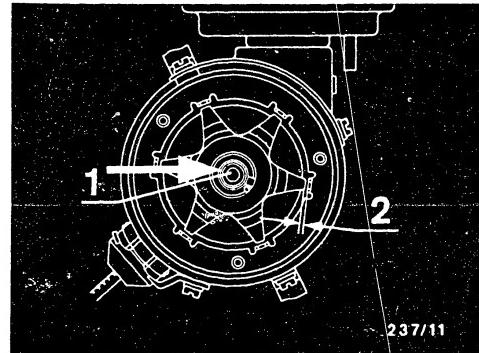
6.5 Testing the minimum air gap between teeth of trigger wheel and teeth of pulse generator (test specifications W-237/1001...)

Clamp the distributor on the distributor test bench (not in vise!). Bring tooth of trigger wheel opposite tooth of pulse generator (see illustration). Press the distributor shaft by hand in the direction of the air gap being measured (arrow). This results in the minimum air gap. Test each air gap individually with feeler gauge (4, 5, 6 times, depending on number of cylinders). The minimum air gap must not be less than the value given in the test specifications.

If the minimum air gap is less than the value given, the ignition distributor must be replaced (worn bearing bushings).

A greater air gap is permissible.

Mount the distributor cap, dust-protection cover and distributor rotor.



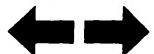
1 = Press by hand
(thumb)

2 = Minimum air gap

237/11

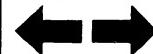
D9

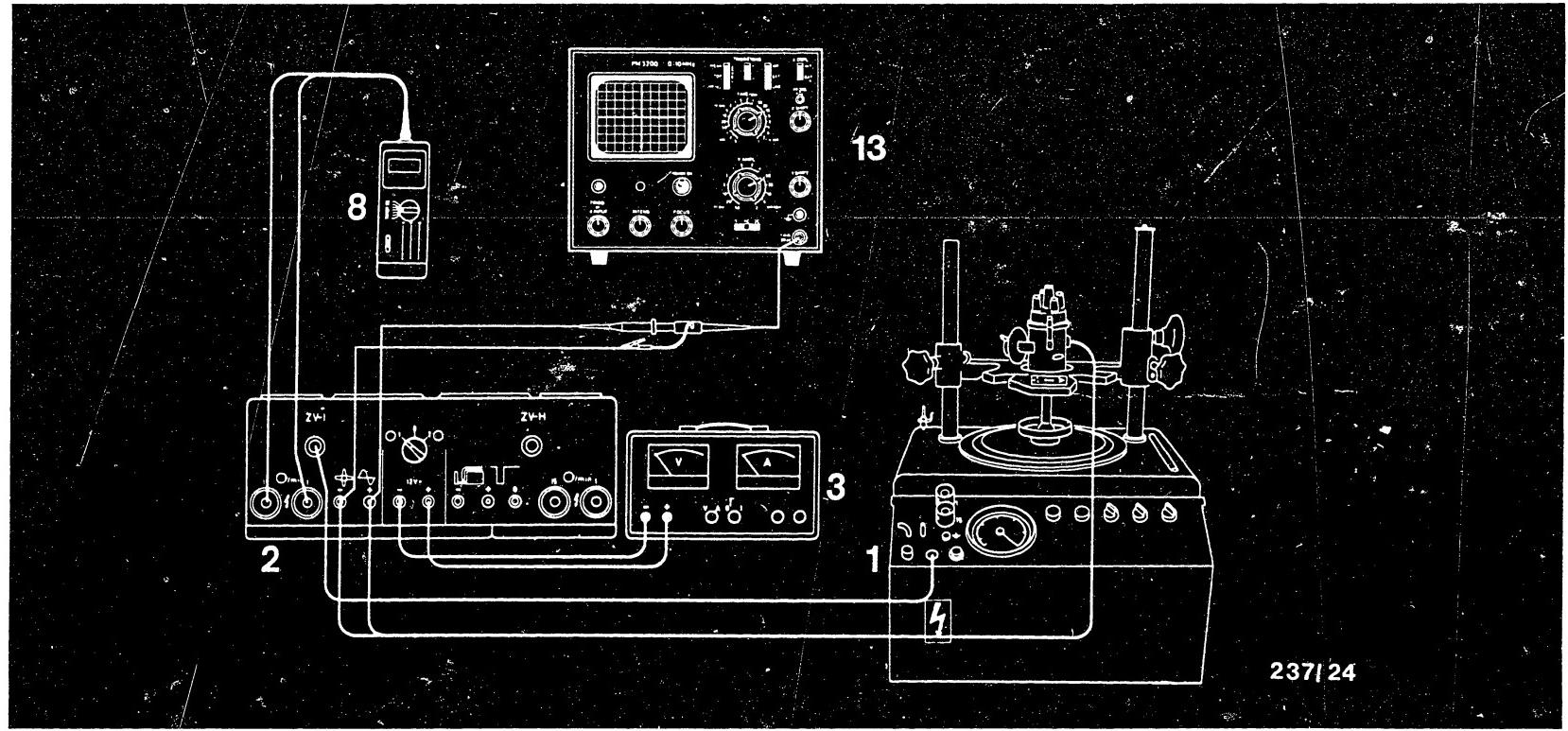
Testing
Ignition distributors 0 237..., ZV-I



D10

Testing
Ignition distributors 0 237..., ZV-I





1 = Distributor test bench
2 = Distributor test adapter

3 = Voltage stabilizer/battery
8 = Tachometer

13 = Oscilloscope

6.6 Testing the minimum voltage of pulse generators with normal polarity (not given in test specifications)

Clamp the distributor in position and connect to testers and ZV-I test adapter in accordance with above terminal diagram.
Follow operating instructions of the individual testers.

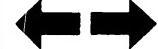
D11

Testing
Ignition distributors 0 237..., ZV-I

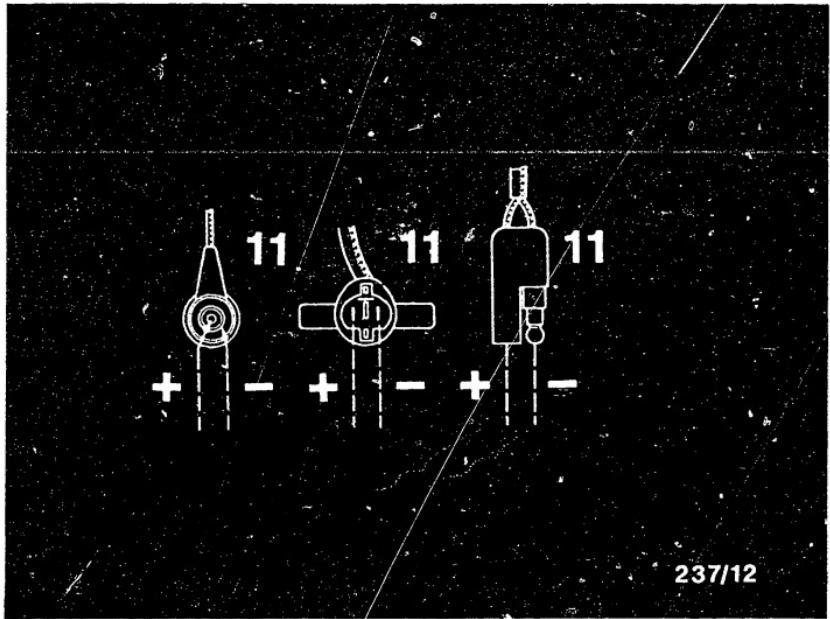


D12

Testing
Ignition distributors 0 237..., ZV-I



237/24



237/12

11 = Different distributor connectors

When connecting the universal connecting cable KDZV 7203 it is necessary to observe the polarity on the above-shown distributor connectors.

Operate the ignition distributor at 500 min^{-1} .

Voltage curve: With correct polarity, the positive half-wave begins with a gradual rise and, after peaking, drops steeply into the zero crossing (see following oscilloscope patterns).

D 13

Testing

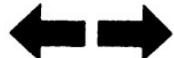
Ignition distributors 0 237..., ZV-I

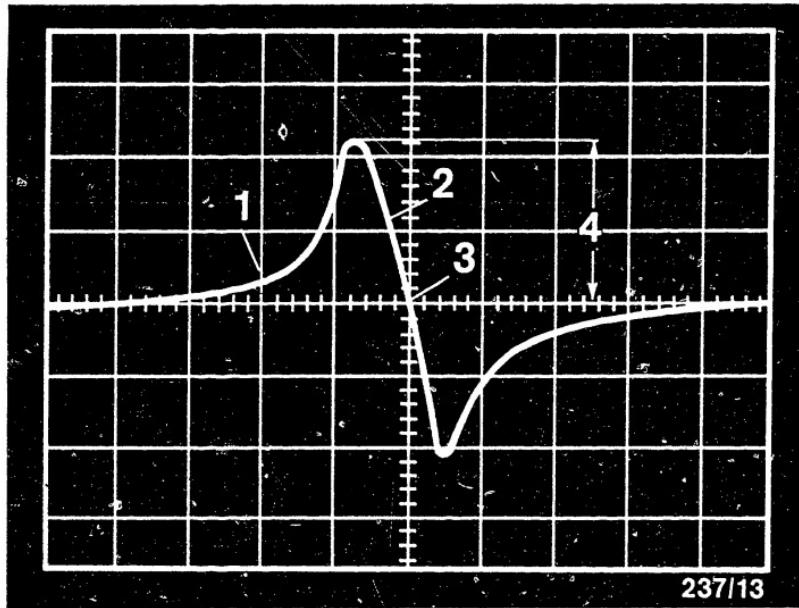


The curve of the pulse generator minimum voltage must correspond to the OK oscilloscope pattern. If this is not the case, then the oscilloscope is incorrectly connected to the electric lead or to the socket (polarity reversed).

If the pulse generator minimum voltage for the positive half-wave specified in the OK oscilloscope pattern is not reached, then the teeth of normal pulse generators may be carefully bent to the specified minimum air gap. If the pulse generator minimum voltage is still not reached, the pulse generator must be replaced.

Caution: In the case of pulse generators with pointed teeth the pulse generator must not be bent (teeth will break). If the pulse generator minimum voltage is not reached, the pulse generator must be replaced.





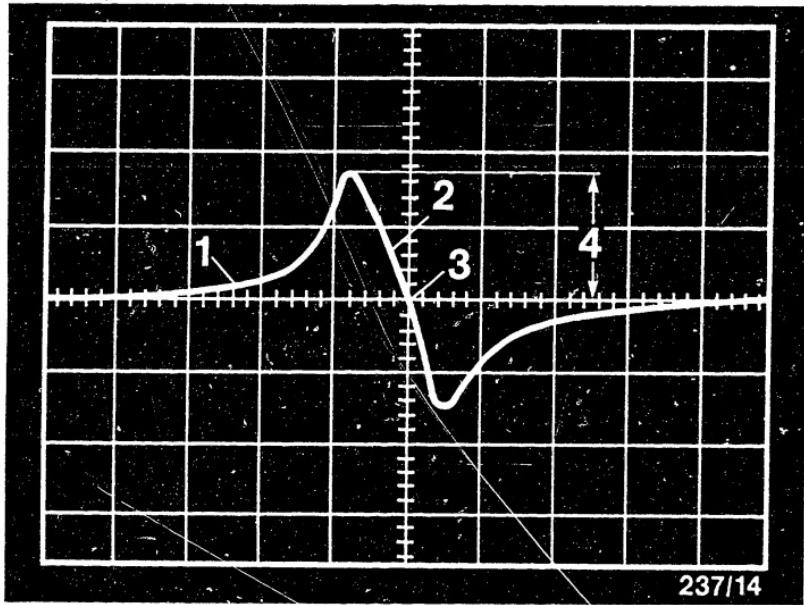
- 1 = Gradual rise
- 2 = Steep drop
- 3 = Zero crossing
- 4 = Pulse generator minimum voltage

OK oscilloscope pattern for 4-cyl. ignition distributor
with 1.1 k Ω pulse generator

Settings

Y = 5.0 V

X = > 2 ms



- 1 = Gradual rise
- 2 = Steep drop
- 3 = Zero crossing
- 4 = Pulse generator minimum voltage

OK oscilloscope pattern for 4-cyl. ignition distributor
with 600 Ω pulse generator

Settings

Y = 5.0 V

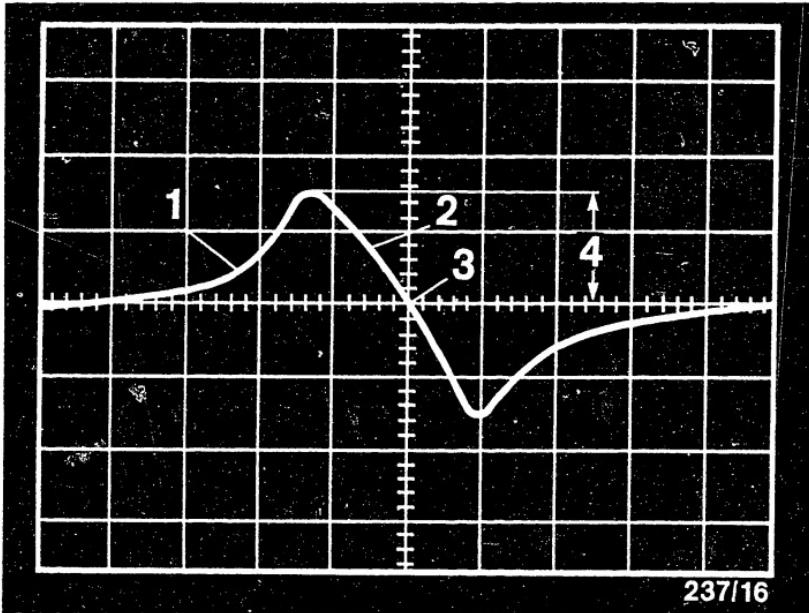
X = > 2 ms

D 16

Testing

Ignition distributors 0 237..., ZV-I





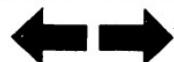
- 1 = Gradual rise
- 2 = Steep drop
- 3 = Zero crossing
- 4 = Pulse generator minimum voltage

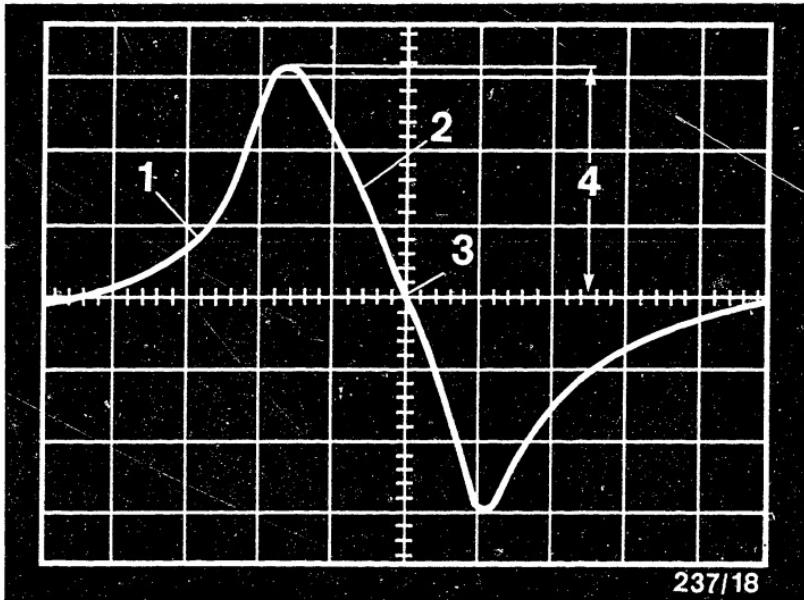
OK oscilloscope pattern for 5-cyl. ignition distributor
with 1.1 k Ω pulse generator

Settings

Y = 5.0 V

X = > 2 ms





- 1 = Gradual rise
- 2 = Steep drop
- 3 = Zero crossing
- 4 = Pulse generator minimum voltage

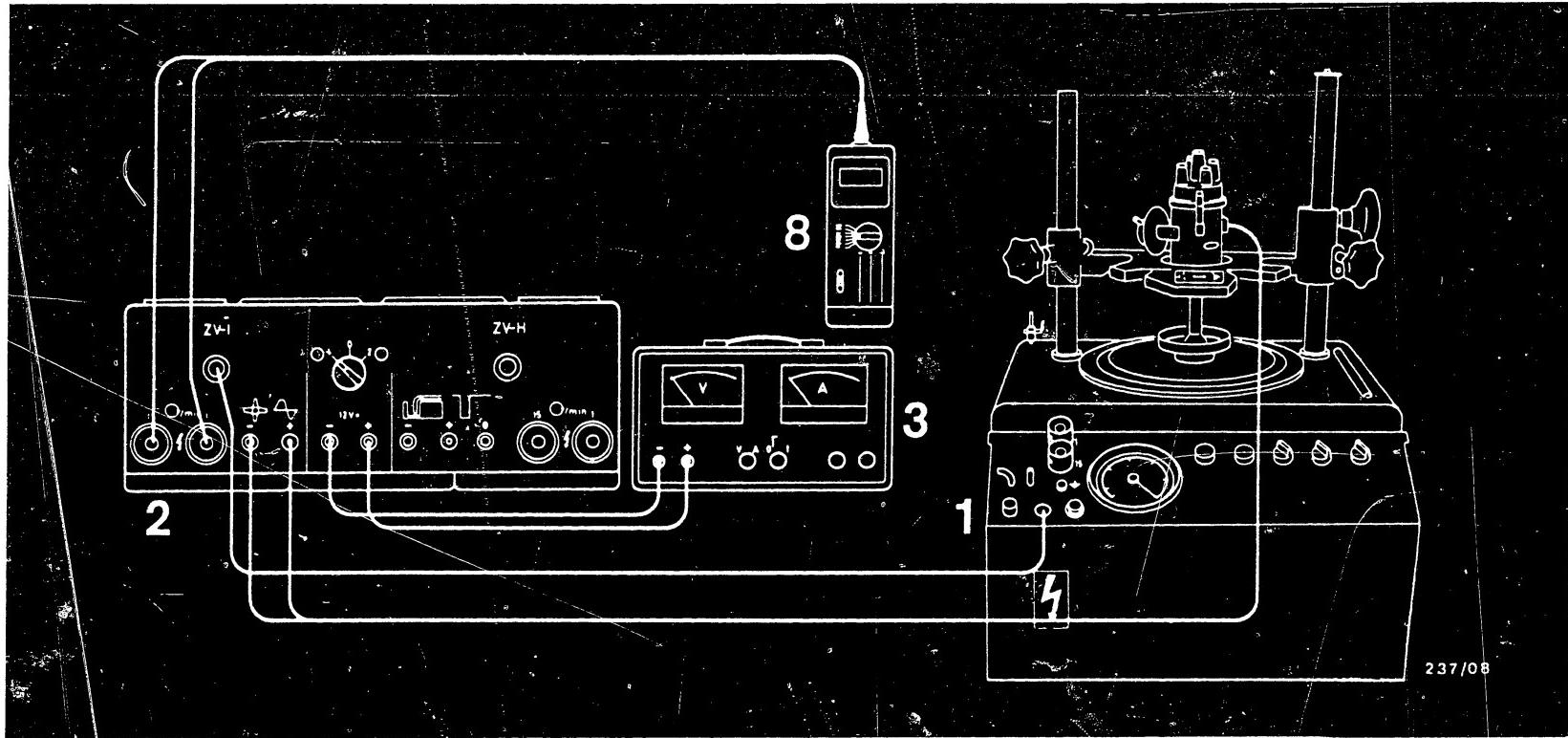
OK oscilloscope pattern for 6-cyl. ignition distributor with 600Ω pulse generator.

Pulse generator has 6 teeth on trigger wheel and 3 teeth on pulse generator.

Settings

$Y = 2.0 \text{ V}$

$X = > 2 \text{ ms}$



1 = Distributor test bench
 2 = Distributor test adapter (ZV-I)
 3 = Voltage stabilizer/battery

7 = Distributor
 8 = Tachometer

7. Testing the centrifugal advance

7.1 Testing ignition distributor with zero-point adjustment (test specifications W-237/1001...)

For testing the centrifugal advance curve, use only the ZV-I test adapter KDZV 7202 specified in the test specifications. Mount the ignition distributor and connect to testers and ZV-I test adapter in accordance with the above terminal diagram. Follow the operating instructions of the individual testers.

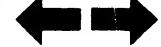
E1

Testing
Ignition distributors 0 237..., ZV-I



E2

Testing
Ignition distributors 0 237..., ZV-I



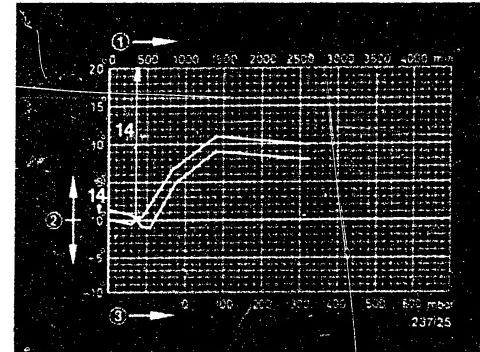
7.1.1 Adjusting the zero point

It is necessary to adjust the zero point because inductive pulse generators have an inherent advance, i.e. there is an advance although the centrifugal advance mechanism is not yet working or has already shut off (see top graph for example).

Switch on the 12 V power supply.

Starting out from the zero point (14) on the distributor graph, move vertically upward and read off the distributor drive speed (arrow) and set this speed on the distributor test bench. Turn the scale ring of the distributor test bench or the ignition distributor so that at the specified zero point speed the illuminated mark of a cylinder lights up at $0^\circ/360^\circ$ (see bottom diagram for example).

Tighten locking screw of ignition distributor or clamping ring of chuck.



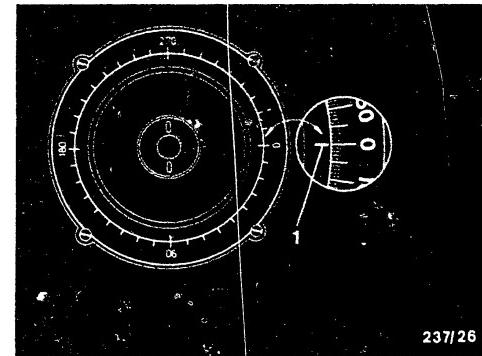
1 = Distributor-shaft speed

2 = Distributor-shaft advance

3 = Negative gauge pressure
(vacuum)

14= Zero point/zero point speed

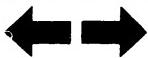
1 = Illuminated mark



E3

Testing

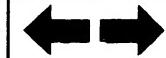
Ignition distributors 0 237..., ZV-I



E4

Testing

Ignition distributors 0 237..., ZV-I



7.1.2 Testing the centrifugal advance

The centrifugal advance is tested at least twice at each change of direction as well as in the end range of a curve. The test is only to be carried out with increasing speed (this avoids measurement errors).

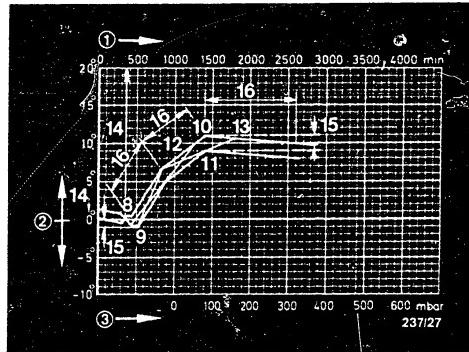
Read off the advance angle and compare with test specifications. See graph for example. If an addition to the tolerance range of $+0.5^\circ$ is given in the test specifications, the upper line of the tolerance range must be extended by 0.5° to the top, and the lower line by 0.5° to the bottom.

If an addition to the tolerance range of $-0.5^\circ/-1.5^\circ$ is given in the test specifications, the upper line must be extended by 0.5° to the bottom, and the lower line by 1.5° to the bottom.

Drive the ignition distributor at the appropriate speed (see test specifications).

If the specified values are not reached, the ignition distributor (advance system) is defective.

Switch off the power supply.



1 = Distributor-shaft speed

2 = Distributor-shaft advance

3 = Negative gauge pressure
(vacuum)

8 / 9 = Start of centrifugal
advance

10 / 11 = End of centrifugal ad-
vance

12 / 13 = In extreme cases the
end of centrifugal ad-
vance may be located
here.

14 = Zero point/zero point speed

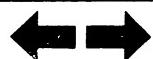
15 = Inherent advance

16 = Change in curve direction

E5

Testing

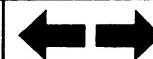
Ignition distributors 0 237..., ZV-I

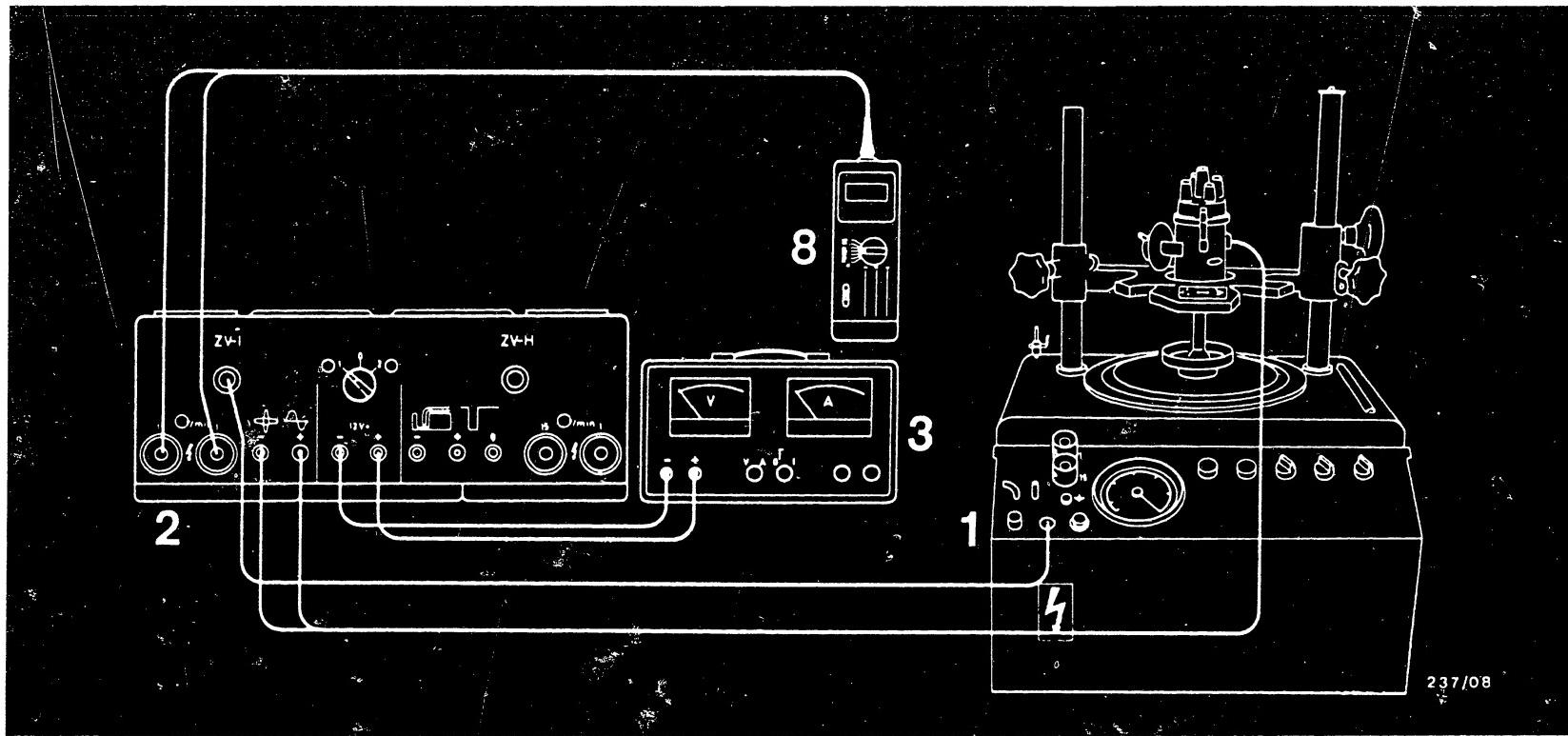


E6

Testing

Ignition distributors 0 237..., ZV-I





1 = Distributor test bench

2 = Distributor test adapter (ZV-I)

3 = Voltage stabilizer/battery

7 = Ignition distributor

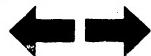
8 = Tachometer

7.2 Testing ignition distributor with setting point in upper speed range - with/without coupled advance curve (test specifications W-237/1001...)

For testing the centrifugal advance curve, use only the ZV-I test adapter KDZV 7202 specified in the test specifications. Mount the ignition distributor and connect to testers and ZV-I test adapter in accordance with the above terminal diagram. Follow the operating instructions of the individual testers.

E7

Testing
Ignition distributors 0 237..., ZV-I



E8

Testing
Ignition distributors 0 237..., ZV-I



7.2.1 Setting the setting point

Switch on the 12 V power supply.

Starting out from the setting point (17) on the distributor graph (see graph for example), move vertically upward and read off the distributor drive speed (arrow) and set this speed on the distributor test bench.

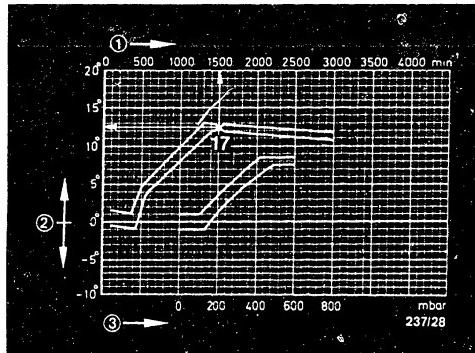
Starting out from the setting point on the distributor graph, move horizontally to the left and read off the distributor-shaft advance (number of degrees) (arrow).

Turn the scale ring of the distributor test bench or the ignition distributor so that the illuminated mark of a cylinder lights up at the stated number of degrees. See graph.

Tighten locking screw of ignition distributor or clamping ring of chuck.

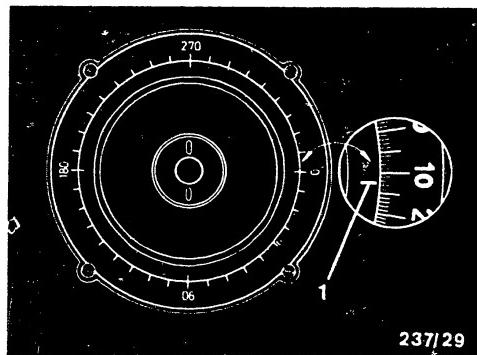
Carefully set the drive speed and the number of degrees on the scale ring since otherwise the measurement result will be incorrect.

Reduce the drive speed to 400 min^{-1} .



- 1 = Distributor-shaft speed
- 2 = Distributor-shaft advance
- 3 = Negative gauge pressure (vacuum)
- 17 = Setting point

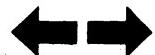
1 = Illuminated mark



237/29

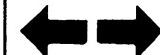
E9

Testing
Ignition distributors 0 237..., ZV-I



E10

Testing
Ignition distributors 0 237..., ZV-I



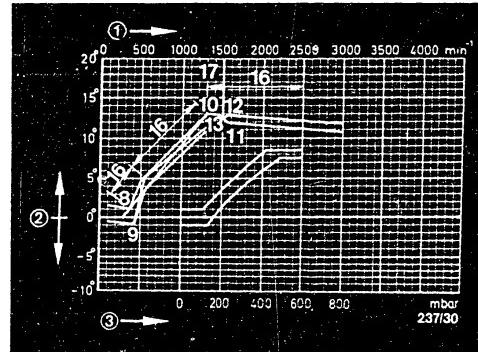
7.2.2 Testing the centrifugal advance

The centrifugal advance is tested with increasing speed at least twice at each change of direction as well as at the end range of a curve.

Read off the advance angle and compare with test specifications. See graph for example. If an addition to the tolerance range of $+0.5^\circ$ is given in the test specifications, the upper line of the tolerance range must be extended by 0.5° to the top, and the lower line by 0.5° to the bottom.

If an addition to the tolerance range of $-0.5^\circ/-1.5^\circ$ is given in the test specifications, the upper line must be extended by 0.5° to the bottom, and the lower line by 1.5° to the bottom.

If the specified values are not reached, the ignition distributor (advance system) is defective.



1 = Distributor-shaft speed

2 = Distributor-shaft advance

3 = Negative gauge pressure
(vacuum)

8/ 9 = Start of centrifugal ad-
vance

10/11 = End of centrifugal ad-
vance

12/13 = In extreme cases the end
of centrifugal advance may
be located here

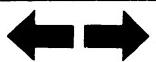
16 = Change in curve direction

17 = Setting point

E11

Testing

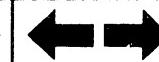
Ignition distributors 0 237..., ZV-I



E12

Testing

Ignition distributors 0 237..., ZV-I



7.2.3 Testing the coupled setting (only necessary for coupled advance curve)

There is a coupled advance curve when a difference is given in the test specification (in degrees) between centrifugal and vacuum advance (advance/retard). See graphs for examples.

Set the drive speed on the distributor test bench to 400 min^{-1} .

Starting out from the setting point on the distributor graph, move horizontally to the left and read off the distributor-shaft advance (number of degrees) (see test specifications). Turn the scale ring of the distributor test bench or the ignition distributor so that the illuminated mark of a cylinder lights up at the stated number of degrees.

Tighten locking screw of ignition distributor or clamping ring of chuck.

Carefully set the drive speed and number of degrees on the scale ring since otherwise the measurement result will be incorrect.

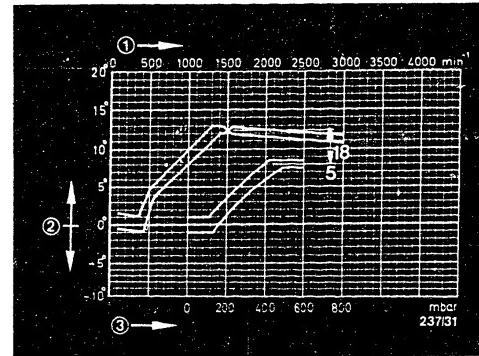
Connect the vacuum hose of the distributor test bench to the vacuum unit (vacuum connection) "advance"/"retard".

Set the vacuum to 600 mbar with the aid of the vacuum pump. Do not switch off the vacuum pump.

The illuminated mark on the distributor test bench has moved.

Read off on the scale ring the difference (18) between the moved illuminated mark and the previously set number of degrees and compare with test specification. See graphs for examples. If the specified difference $\pm 0.5^\circ$ is not reached, the ignition distributor (advance system) is defective.

Switch off the power supply.



1 = Distributor-shaft speed

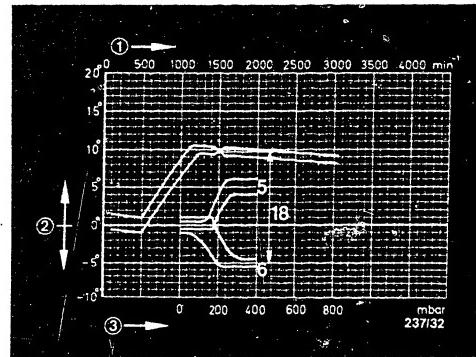
2 = Distributor-shaft advance

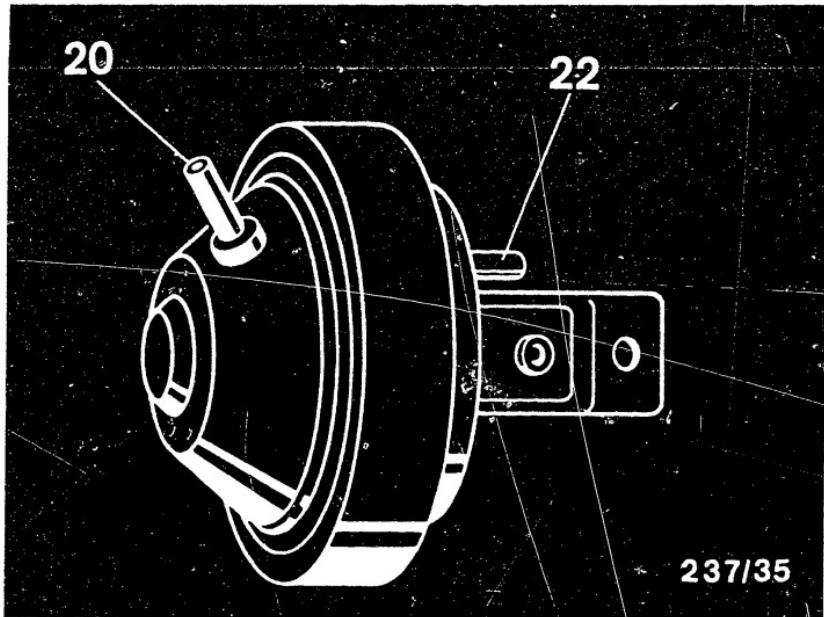
3 = Negative gauge pressure
(vacuum)

5 = Negative gauge pressure
(vacuum) advance

6 = Negative gauge pressure
(vacuum) advance

18 = Difference between centrifugal and vacuum advance





20 = Vacuum connection "advance"

22 = Vacuum connection "retard"

Note:

According to DIN the term "vacuum" should be replaced by "negative gauge pressure". For the sake of clarity, however, we will continue to use "vacuum".

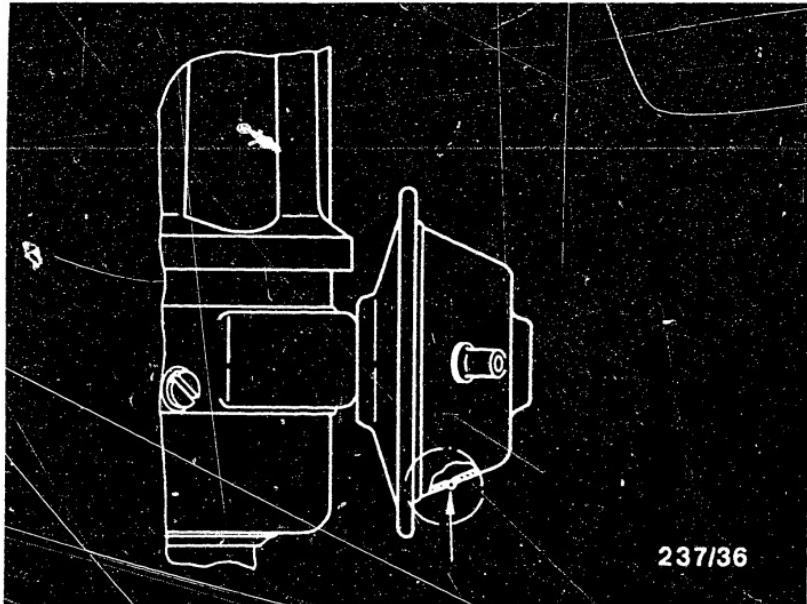
8. Testing the vacuum advance mechanism

8.1 Testing the vacuum unit for leaks

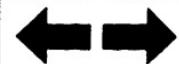
(Not given in test specifications)

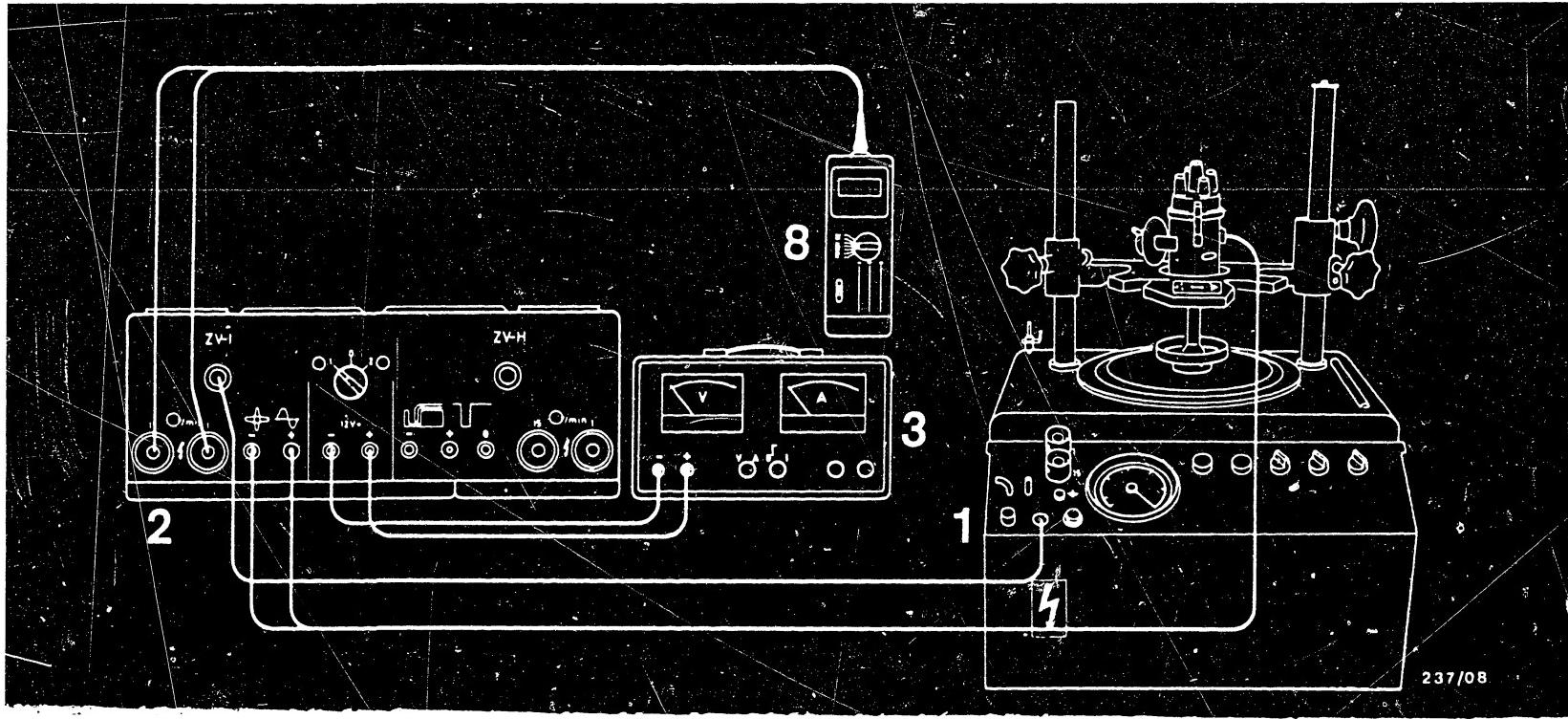
Connect the vacuum hose from the distributor test bench to the vacuum unit.

Using the vacuum pump, increase the vacuum until 600 mbar is reached. Switch off the vacuum pump.



The maximum permissible pressure drop in 1 minute is 20 %. Remedy any leaks found at the connection. Replace vacuum-advance mechanism if leaking.
If there is an extremely heavy drop in pressure, check whether the vacuum unit is of the type which has a vent hole (approx. 0.5 mm diameter). See picture, arrow.
Seal off the hole while testing for leaks.





237/08

- 1 = Distributor test bench
- 2 = Distributor test adapter (ZV-I)
- 3 = Voltage stabilizer/battery

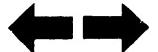
- 7 = Ignition distributor
- 8 = Tachometer

8.2 Testing the vacuum advance (test specifications W-237/1001...).

For testing the vacuum advance curve, use only the ZV-I test adapter KDZV 7202 specified in the test specifications. Mount the ignition distributor and connect to testers and ZV-I test adapter in accordance with the above terminal diagram. Follow the operating instructions of the individual testers.

E17

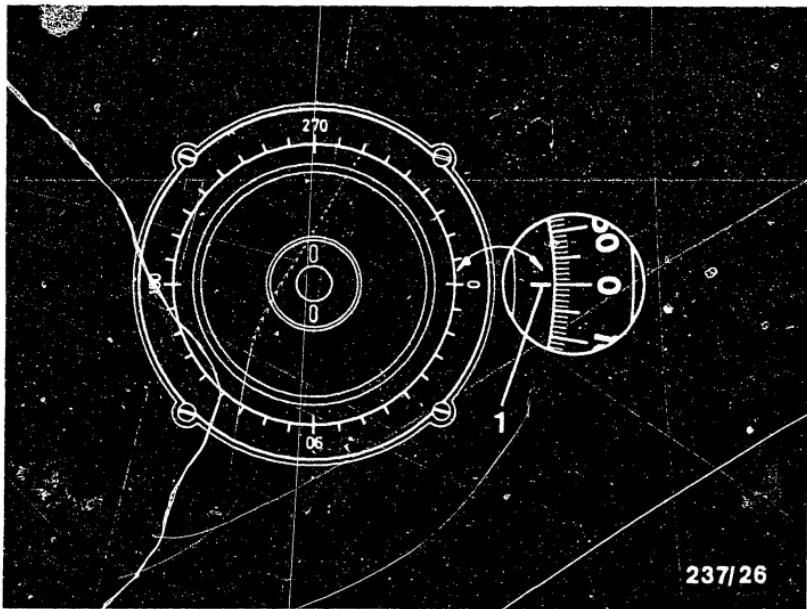
Testing
Ignition distributors 0 237..., ZV-I



E18

Testing
Ignition distributors 0 237..., ZV-I





237/26

1 = Illuminated mark

Switch on the 12 V power supply. Drive the ignition distributor at a speed 200 min⁻¹ above the end of centrifugal advance (see test specifications).

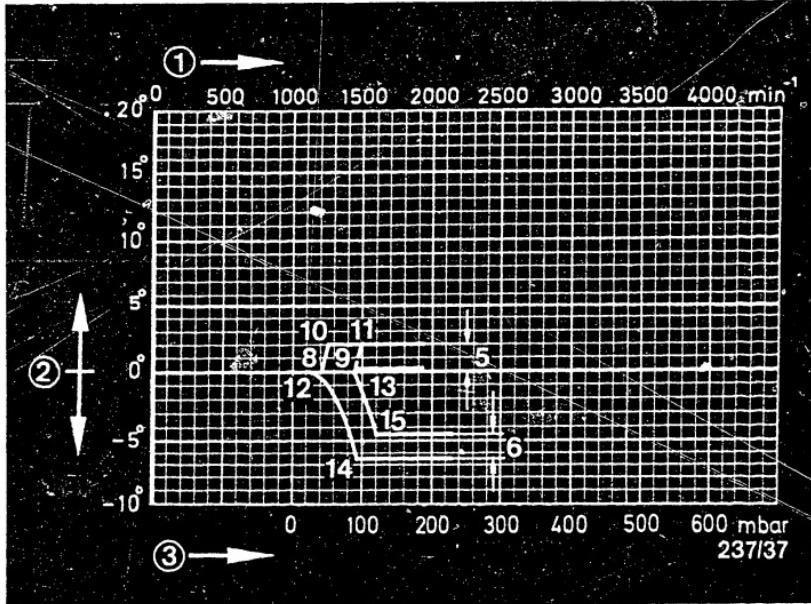
Turn the scale ring of the distributor test bench or the ignition distributor so that the illuminated mark of a cylinder lights up at 0°/360°. See illustration.
Tighten locking screw of ignition distributor or clamping ring of chuck.

E19

Testing

Ignition distributors 0 237..., ZV-I





- 1 = Distributor-shaft speed
- 2 = Distributor-shaft advance
- 3 = Negative gauge pressure
(vacuum)
- 5 = Negative gauge pressure
(vacuum) advance
- 6 = Negative gauge pressure
(vacuum) retard

- 8/9, 12/13 = Start of vacuum advance "advance and retard unit"
- 10/11, 14/15 = End of vacuum advance "advance and retard unit"

With increasing vacuum, check whether the advance angle is within the stated tolerance range. See figure for example.

If an addition to the tolerance range of $\pm 0.5^\circ$ is given in the test specifications, the upper line must be extended by 0.5° to the top and the lower line by 0.5° to the bottom.

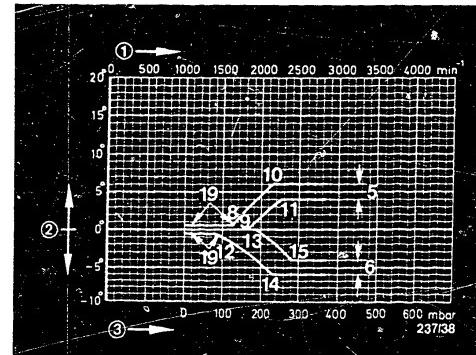
If the measured values are not within the tolerance range, then check the vacuum advance system for freedom of movement.

After reaching the end of advance, an increase in the vacuum must not result in a further advance.

Switch off the power supply.

Advance curve with "adjustment base" (19)

After the zero-point adjustment of the distributor test bench (scale ring) it is possible, with increasing vacuum, for there already to be a slight advance (max. 0.5°) although the actual vacuum advance only starts at points 8/9 or 12/13.



1 = Distributor-shaft speed

2 = Distributor-shaft advance

3 = Negative gauge pressure
(vacuum)

5 = Negative gauge pressure
(vacuum). advance

6 = Negative gauge pressure
(vacuum). retard

8/ 9, 12/13 = Start of vacuum
advance "advance and retard
unit"

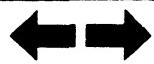
10/11, 14/15 = End of vacuum advance
"advance and retard unit"

19 = "Adjustment base"

E21

Testing

Ignition distributors 0 237..., ZV-I



E22

Testing

Ignition distributors 0 237..., ZV-I



9. Testing the vacuum/overpressure advance mechanism pressure unit with one or two connecting pipes.

9.1 Testing the vacuum or overpressure unit for leaks

(Not given in test specifications)

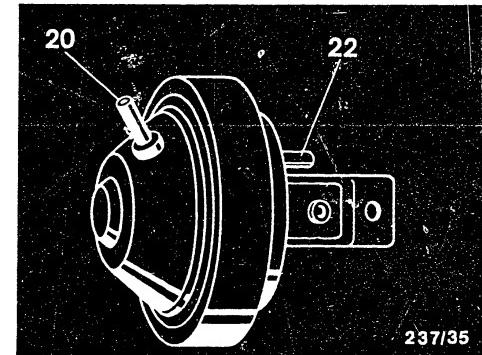
Connect the vacuum hose from the distributor test bench to the pressure unit.

In the case of the vacuum/overpressure unit with double retard, the overpressure unit is also tested for leaks using vacuum.

In the case of the vacuum/overpressure unit with one connecting pipe, the advance and retard unit is tested for leaks using vacuum.

Using the vacuum pump, increase the vacuum until 600 mbar is reached. Switch off the vacuum pump.

The max. permissible pressure drop in 1 minute is 20%. Remedy any leaks at the connection. Replace vacuum-advance mechanism if leaking.



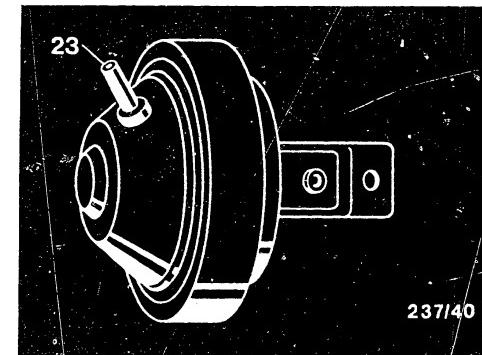
237/35

20 = Vacuum connection "retard"

22 = Overpressure connection "retard"

23 = Vacuum connection "advance"

and
overpressure connection "retard"



237/40

F1

Testing

Ignition distributors 0 237..., ZV-I

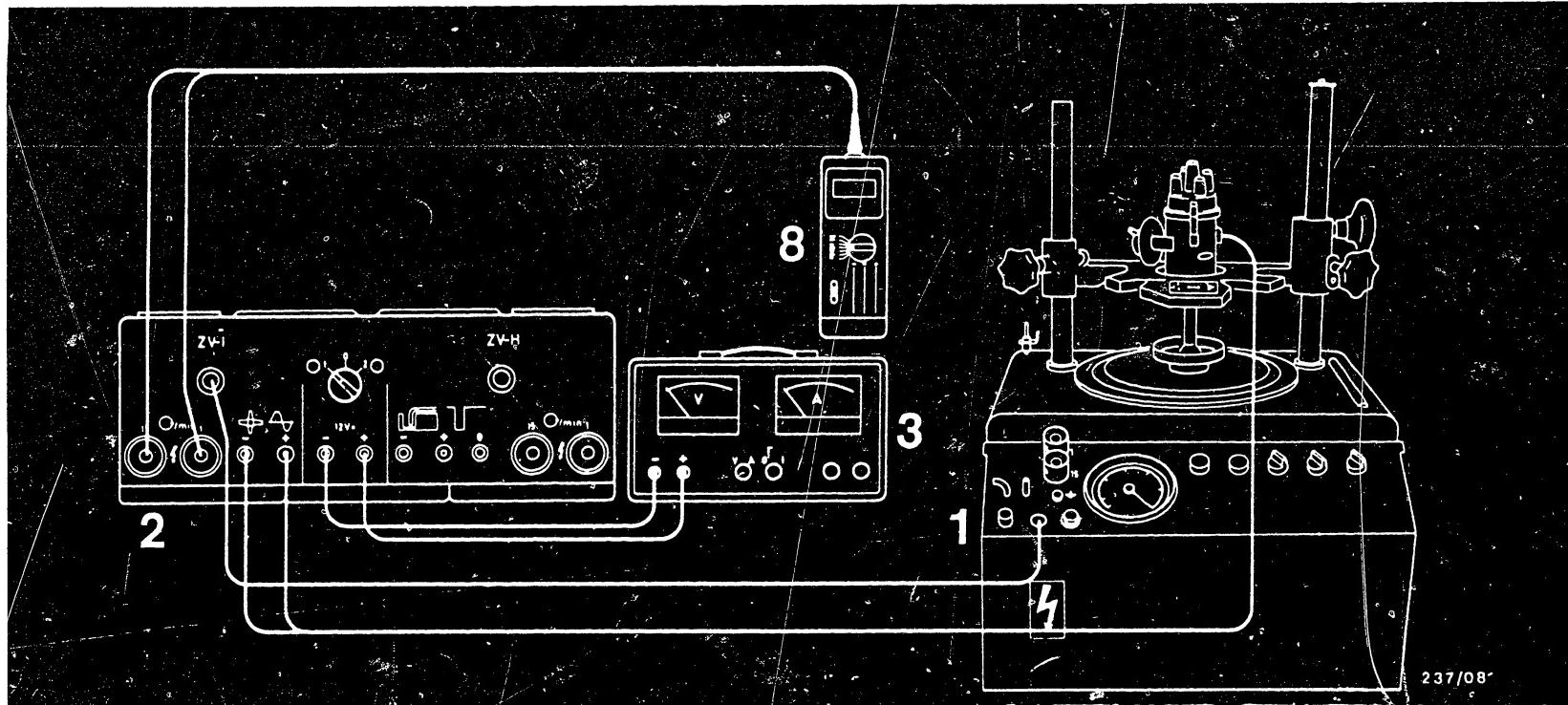


F2

Testing

Ignition distributors 0 237..., ZV-I





1 = Distributor test bench
 2 = Distributor test adapter (ZV-I)
 3 = Voltage stabilizer/battery

7 = Ignition distributor
 8 = Tachometer

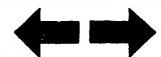
9.2 Testing the vacuum/overpressure advance (test specification W-237/1001...)

For testing the vacuum/overpressure advance curve, use only the ZV-I test adapter KDZV 7202 specified in the test specifications.

Mount the ignition distributor and connect to testers and ZV-I test adapter in accordance with the above terminal diagram. Follow the operating instructions of the individual testers.

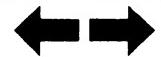
F3

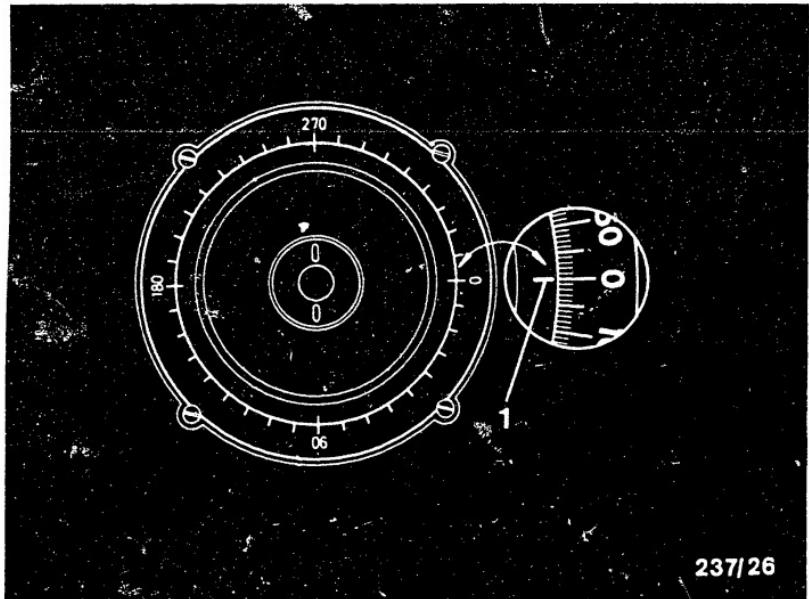
Testing
Ignition distributors 0 237..., ZV-I



F4

Testing
Ignition distributors 0 237..., ZV-I





237/26

1 = Illuminated mark

9.2.1 Testing the vacuum advance

Switch on the 12 V power supply.

Drive the ignition distributor at a speed 200 min^{-1} above the end of centrifugal advance (see test specifications).

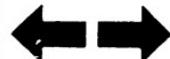
Turn the scale ring of the distributor test bench or the ignition distributor so that the illuminated mark of a cylinder lights up at $0^\circ/360^\circ$. See illustration.

Tighten locking screw of ignition distributor or clamping ring of chuck.

F5

Testing

Ignition distributors 0 237..., ZV-I



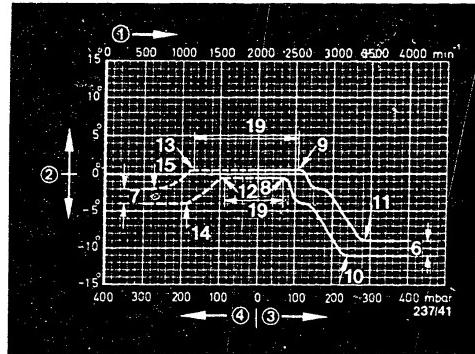
With increasing vacuum, check whether the advance angle is within the stated tolerance range. See figure for example.

If an addition to the tolerance range of $\pm 0.5^\circ$ is given in the test specifications, the upper line must be extended by 0.5° to the top, and the lower line by 0.5° to the bottom. If the measured values are not within the tolerance range, check the vacuum advance system for freedom of movement.

After reaching the end of advance, an increase in the vacuum must not result in any further advance.

Advance curve with "adjustment base" (19)

After the zero-point adjustment of the distributor test bench (scale ring) it is possible, with increasing vacuum, for there already to be a slight advance (max. 0.5°) although the actual vacuum advance only starts at point 8/9.



- 1 = Distributor-shaft speed
- 2 = Distributor-shaft advance
- 3 = Negative gauge pressure (vacuum)
- 4 = Gauge pressure
- 6 = Negative gauge pressure (vacuum) retard
- 7 = Gauge pressure retard
- 8/ 9, 12/13 = Start of vacuum/over-pressure advance with double retard
- 10/11, 14/15 = End of vacuum/over-pressure advance with double retard
- 19 = "Adjustment base"

F6

Testing
Ignition distributors 0 237..., ZV-I



F7

Testing
Ignition distributors 0 237..., ZV-I



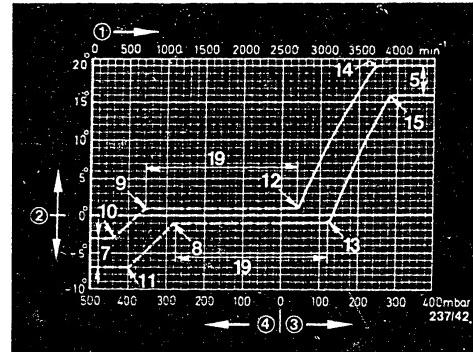
Further example of an advance curve, e.g. vacuum advance

Advance curve with "adjustment base" (19)

After the zero-point adjustment of the distributor test bench (scale ring) it is possible, with increasing vacuum, for there to be a slight advance (max. 0.5°) although the actual vacuum advance only starts at point 12 and 13.

Note:

The double unit with one connecting pipe advances when vacuum is applied to it and retards when overpressure is applied to it.

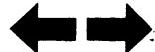


- 1 = Distributor-shaft speed
- 2 = Distributor-shaft advance
- 3 = Negative gauge pressure (vacuum)
- 4 = Gauge pressure
- 5 = Negative gauge pressure (vacuum) advance
- 7 = Gauge pressure retard
- 8/ 9, 12/13 = Start of vacuum/over-pressure advance with advance/retard
- 10/11, 14/15 = End of vacuum/over-pressure advance
- 19 = "Adjustment base"

F8

Testing

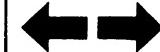
Ignition distributors 0 237..., ZV-I

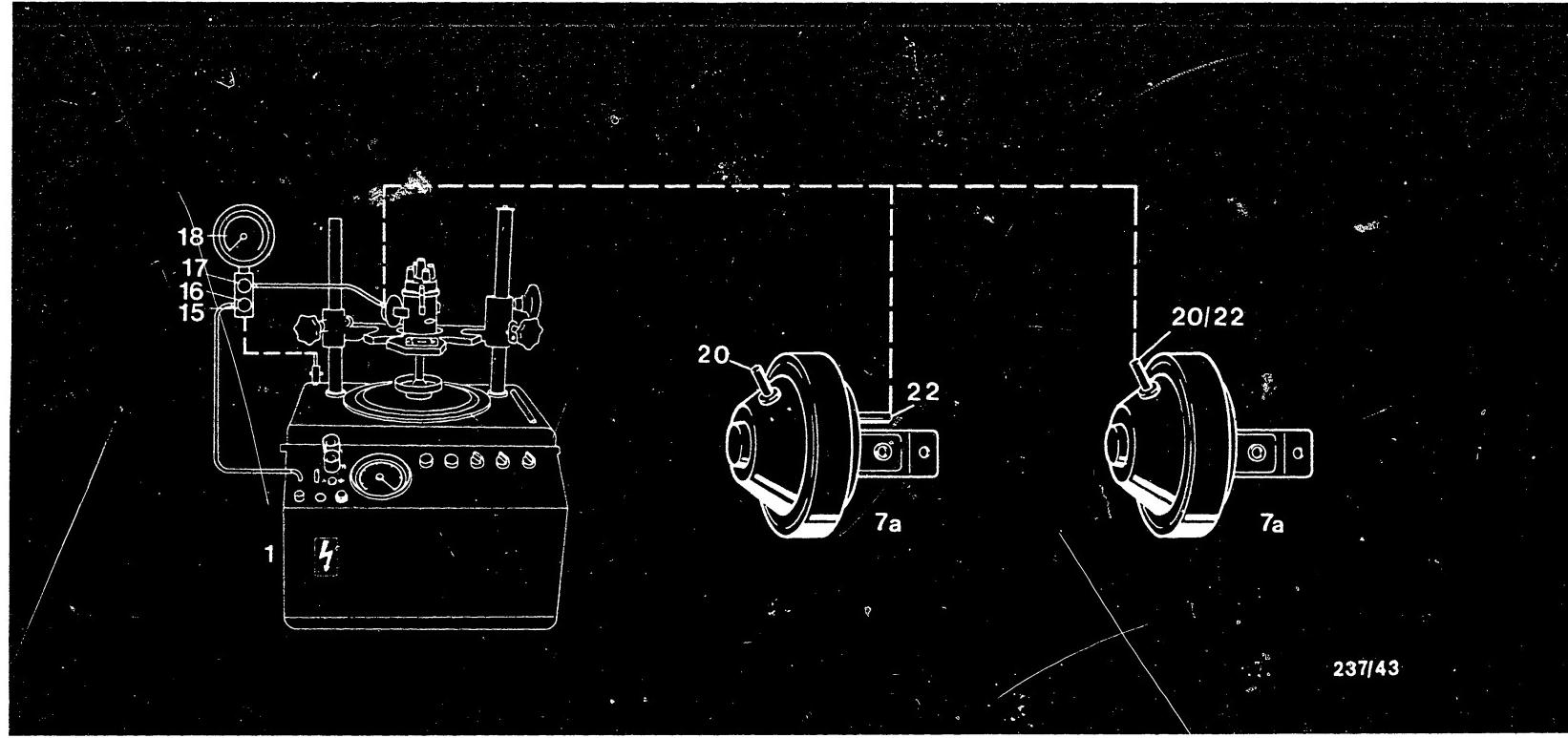


F9

Testing

Ignition distributors 0 237..., ZV-I





237/43

1 = Distributor test bench

7a = Vacuum/overpressure unit

15 = Adjustment throttle

16 = Adjusting screw

17 = Screw plug

18 = Pressure gauge

20 = Vacuum connection "retard"

22 = Overpressure connection "retard"

9.2.2 Testing the overpressure advance

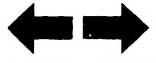
Connect the overpressure connection of the distributor test bench to the lower connection of the adjustment throttle. Connect the overpressure connection of the ignition distributor to the upper connection of the adjustment throttle. See connection diagram above.

Note: Adjusting screw (16) is for setting the pressure. If a pressure of 1.2 bar is not reached, then screw out the adjusting screw (16) and coat the thread with tough grease. Re-fit the adjusting screw (16). The screw plug (17) is open while testing.

F10

Testing

Ignition distributors 0 237..., ZV-I



F11

Testing

Ignition distributors 0 237..., ZV-I



With increasing overpressure, check whether the advance angle is within the stated tolerance range. The figure for example.

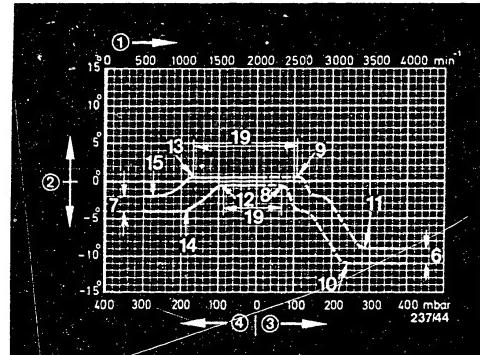
If an addition to the tolerance range of $+0.5^\circ$ is given in the test specifications, the upper line must be extended by 0.5° to the top, and the lower line by 0.5° to the bottom.

If the measured values are not within the tolerance range, check the vacuum advance system for freedom of movement.

After reaching the end of advance, an increase in the overpressure must not result in any further advance.

Advance curve with "adjustment base"

After the zero-point adjustment of the distributor test bench (scale ring) it is possible, with increasing overpressure, for there already to be a slight advance (max. 0.5°) although the actual overpressure advance only starts at point 12/13.



1 = Distributor-shaft speed

2 = Distributor-shaft advance

3 = Negative gauge pressure
(vacuum)

4 = Gauge pressure

6 = Negative gauge pressure
(vacuum) retard

7 = Gauge pressure retard

8/ 9, 12/13 = Start of vacuum/
overpressure advance with
double retard

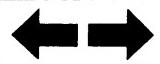
10/11, 14/15 = End of vacuum/
overpressure advance with
double retard

19 = "Adjustment base"

F12

Testing

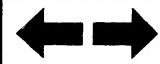
Ignition distributors 0 237..., ZV-I



F13

Testing

Ignition distributors 0 237..., ZV-I

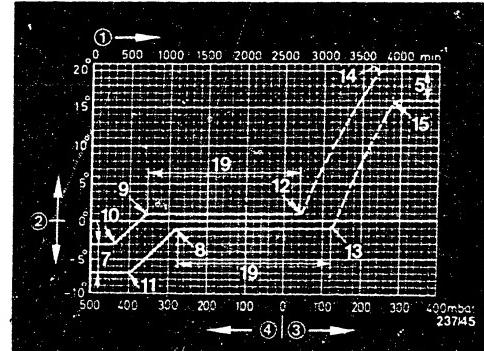


Further example of an advance curve - overpressure retard

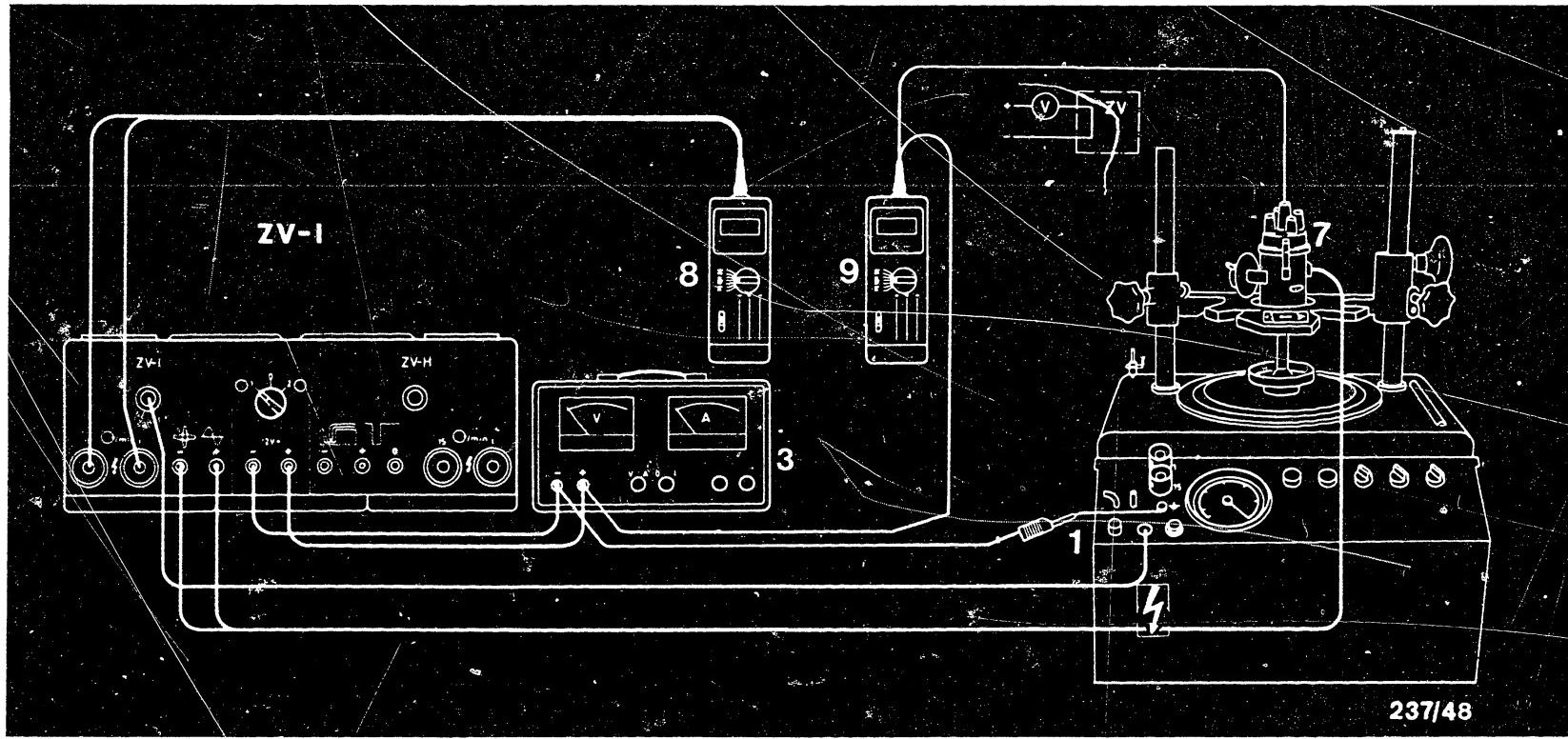
Advance curve with "adjustment base" (19)

After the zero-point adjustment of the distributor test bench (scale ring) it is possible, with increasing overpressure, for there already to be a slight advance (max. 0.5°) although the actual overpressure advance only starts at point 8/9.

Note: The double unit with one connecting pipe advances when vacuum is applied to it and retards when overpressure is applied to it.
Switch off the 12 V power supply.



- 1 = Distributor-shaft speed
- 2 = Distributor-shaft advance
- 3 = Negative gauge pressure (vacuum)
- 4 = Gauge pressure
- 5 = Negative gauge pressure (vacuum) advance
- 7 = Gauge pressure retard
- 8/ 9, 12/13 = Start of vacuum/over-pressure advance with advance/retard
- 10/11, 14/15 = End of vacuum/over-pressure advance
- 19 = "Adjustment base"



237/48

1 = Distributor test bench
 2 = Distributor test adapter (ZV-I)
 3 = Voltage stabilizer/battery

7 = Ignition distributor
 8 = Tachometer
 9 = Voltmeter

10. Testing the engine-speed limiter (test specifications VDT-W-237/1001...).

Mount the ignition distributor and connect to testers in accordance with the above terminal diagram. Follow the operating instructions of the individual testers.

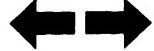
Switch on the 12 V power supply.

Drive the ignition distributor at the specified speed.

The engine-speed limiter is O.K. if, up to the specified minimum speed, the voltmeter does not indicate voltage. However, it must indicate voltage no later than as of the specified maximum speed. Switch off the power supply.

F16

Testing
Ignition distributors 0 237..., ZV-I



F17

Testing
Ignition distributors 0 237..., ZV-I



10. List of test specifications with advance curves for
breakerless ignition distributors 0 237..65 mm hous.dia.

The part numbers of the ignition distributors are arranged in ascending order. They are followed by the number of the corresponding microfiche with the coordinate number.

Part number of ignition dis- tributor	FD	See microfiche W-237/	Coordinate
0 237 001 001		1001	A 3
002		1001	A 4
003		1001	A 5
004		1001	A 6
006		1001	A 7
007		1002	A 3
002 001		1001	A 8
004		1001	A 9
005		1001	A 10
006		1001	A 11
007		1001	A 12
010		1001	A 13
011		1001	A 14
012		1001	A 15
013		1001	A 16
014		1001	A 17
015		1001	A 18
017		1001	A 19
018		1001	A 20
020/021		1001	A 21
022		1001	A 22
023		1001	A 23
024		1001	A 24
026		1001	B 1
031		1001	B 2
032		1001	B 3

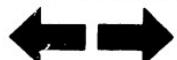


Part number of ignition dis- tributor	FD	See microfiche W-237/	Coordinate
0 237 002 033		1001	B 4
034		1001	B 5
035		1001	B 6
036		1001	B 7
037		1001	B 8
038		1001	B 9
039		1001	B 10
041		1002	A 4
043		1001	B 11
044		1001	B 12
049		1001	B 13
050		1001	B 14
053		1001	B 15
054/055		1001	B 16
056		1001	B 17
057		1002	A 5
058		1001	B 18
059/060		1001	B 19
061		1001	B 20
062		1001	B 21
063		1001	B 22
064		1001	B 23
066/067		1001	B 24
069		1001	C 1
070		1002	A 6
071		1001	C 2
072		1001	C 3
080		1002	A 7
084/085		1002	A 8
003 001		1001	C 4
001	628→	1002	A 9
003		1001	C 5
008	→729	1002	A 10
008	730→	1001	C 6
009		1001	C 7
013		1001	C 8
014		1001	C 9

H2

List of test specifications

Ignition distributors 0 237..., ZV-I

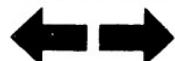


Part number of ignition dis- tributor	FD	See microfiche W-237/	Coordinate
0 237 003 018/019		1001	C 10
022/023		1001	C 11
024		1001	C 12
025/026		1001	C 13
027		1001	C 14
028		1001	C 15
029		1001	C 16
034		1001	C 17
035		1002	A 11
004 001/002		1001	C 18
005/006		1001	C 19
005 001		1001	C 20
002		1001	C 21
003		1001	C 22
004		1001	C 23
005		1001	C 24
008		1002	A 12
009		1002	A 13
006 001/002		1001	D 1
003/004		1001	D 2
005/006		1001	D 3
009/010		1001	D 4
007 001	→727	1002	A 14
001/003	728→	1001	D 5
002/004		1001	D 6
005/006		1001	D 7
007/008		1001	D 8
008 001/002		1001	D 9
009 001		1002	A 15
002		1002	A 16
003		1001	D 10
004		1001	D 11
006		1002	A 17
007		1001	D 12
008		1001	D 13
013	→246	1002	A 18

H3

List of test specifications

Ignition distributors 0 237..., ZV-I



Part number of ignition dis- tributor	FD	See microfiche W-237/	Coordinate
0 237 009 013	247→	1002	A 19
010 001/002		1001	D 14
003		1001	D 15
011 001		1001	D 16
002		1001	D 17
003		1001	D 18
004		1001	D 19
005		1001	D 20
006		1002	A 20
012 001/002		1001	D 21
013 001		1001	D 22
016 001/002		1001	D 23
005/006		1002	A 21



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